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SOCIETY OF SCOTLAND

WITH
AN ABSTRACT OF THE PROCEEDINGS AT BOARD AND GENERAL
MEETINGS, AND THE PREMIUMS OFFERED BY
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. *It is to be distinctly understood that the Society is not responsible for the views, statements, or opinions of any of the Writers whose Papers are published in the 'Transactions.'*

JOHN STIRTON,
Secretary.

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TRANSACTIONS

OF

THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND

THE PROBABLE EFFECTS ON BRITISH AGRICULTURE OF THE RECOMMENDATIONS OF THE UNITED NATIONS CONFERENCE ON FOOD AND AGRICULTURE.

By SIR JOHN BOYD ORR, M.D., D.Sc., F.R.S., &c.,
Aberdeen.

THE first requirement for a stable and prosperous agriculture is a definite long-term policy, with a guaranteed market at a remunerative price for the main products. But agriculture in Scotland is essentially food production, and a guaranteed market for any foodstuff is impossible unless there is a guarantee that it is needed and will be consumed, and the price to the farmer must be related to the cost to the consumer. Production and consumption must be considered together. In other words, an agricultural policy must be part of a food policy. This is now fully recognised in the reports of the political parties on post-war agriculture. Then again a food policy must take account of other interests. In peace-time, food imports helped to pay for exported industrial products and the dividend on overseas investments. Hence, a food policy must fit into a general social and economic policy. In pre-war days there was a conflict between the interests of the consumer and those of the producer and between the home producer and the importer, and British agriculture generally came off worst because there are ten consumers to one producer, and industrialists and financiers have more influence in Parliament than farmers. The most hopeful feature of the Conference on Food and Agriculture is that its findings were arrived at after a review, on a world-wide scale, of all aspects of food and agriculture, and the recommendations

2 RECOMMENDATIONS OF THE UNITED NATIONS CONFERENCE.

made afford a means of reconciling what have been regarded as conflicting interests.

There is always a danger that plans made during a war for improved post-war conditions are forgotten when peace comes. Farmers, like others, have some cause to distrust promises made during war. But the recommendations of the Conference had their origin in pre-war days. The nations were moving towards the kind of policy outlined by the Conference before the war began. To appreciate the importance of the Conference, it is necessary to keep in view the pre-war events and the pre-war movement which culminated in the Conference.

After the last war there was a slump in agriculture, which reached its climax after the 1929-30 world economic crisis. There was a glut of some foodstuffs for which there was no market. It was naturally assumed that, owing to increased production during the war, world production had come to exceed consumption requirements. Measures were therefore taken to restrict production and distribution. As a matter of fact, it was subsequently realised that the glut was due not so much to increased production as to the fact that in almost all countries unemployment had reached unprecedented levels with resulting decreased purchasing power. The collapse in agriculture was part of a world-wide collapse in trade.

Concurrently with the slump in agriculture, which resulted from a glut of food which could not be sold at a remunerative price, there arose a movement for improved nutrition destined to have a profound effect on agriculture. Until about twenty-five years ago, it was generally assumed that if people had sufficient food to satisfy hunger, the needs of the body would be met. But discoveries in the field of nutrition showed that a number of diseases, the cause of which had long been a mystery, and also a good deal of ill-health prevalent, especially among the poor, were due to the lack of certain specific nutrients. Some foods, such as milk, dairy products, eggs, fruit, vegetables, meat, and fish are rich in these nutrients, and are called 'protective' foods because they protect against disease. On the other hand, other foodstuffs, such as white bread, sugar, margarine, and jam, which satisfy hunger at low cost, are poor in these nutrients. Dietary surveys done in Britain in the 1930s showed that between a third and a half of the population did not eat sufficient of the protective foods for health. The main cause of the faulty diet was the fact that sufficient of the relatively expensive protective foods was beyond the purchasing power of poor families. Investigations in the United States and, subsequently, in other countries revealed a somewhat similar state of affairs.

Thus it came about that there were those two apparently conflicting demands made on the Government—one to control production and raise prices in the interest of agriculture, and one to increase production of protective foods and lower prices in the interest of national health. The Government met both of these demands by a number of measures—*e.g.*, subsidies, quotas, agricul-

tural marketing boards and tariffs to help agriculture, and social and public health measures to improve the diet of the poor. In the United States, and also in other countries, measures of a somewhat similar nature were taken to assist agriculture and improve national health.

It became obvious that these piece-meal measures would need to be replaced by a permanent food policy. In 1934 the Right Hon. S. M. Bruce, in an address to the Assembly of the League of Nations, warned governments that an economic system which involved the restriction of the production and distribution of food which people urgently needed was one which could not endure. He suggested that the nations should get together to work out a food policy which would bring about "the marriage of health and agriculture." The idea was welcomed by all the governments adhering to the League of Nations, and an International Committee, consisting of nutrition experts, agriculturists, and economists was set up to investigate the food position in relation to health, agriculture, and trade. By 1937 twenty different governments had set up Nutrition Committees, and the first meeting of the delegates of these National Committees was held in 1938. This movement was brought to a close for the time being by the outbreak of war. The Food and Agriculture Conference of 1943 was, therefore, a revival of a scheme which was well advanced before the war began.

THE REPORT OF THE CONFERENCE ON FOOD AND AGRICULTURE.

The main findings may be summarised as follows :—

1. The kind of food needed for health is known.
2. In the best-fed nations between 20 and 30 per cent of the population do not enjoy a diet adequate for health. In many countries the majority of the population are in this position.
3. Lack of sufficient of the right kind of food is the cause of disease, physical disabilities, and untimely death.
4. The first cause of malnutrition is poverty.
5. Lack of sufficient food is due neither to lack of knowledge nor to the niggardliness of nature.

Having reached these conclusions, the following recommendations were made :—

1. Each government should undertake the primary responsibility for seeing that its people have available a diet adequate for health.
2. All governments should co-operate with each other to have this done for the people of all countries.
3. A permanent food and agriculture organisation, on which all governments will be represented, should be established to enable these recommendations to be carried out.

4 RECOMMENDATIONS OF THE UNITED NATIONS CONFERENCE.

Such are the unanimous recommendations of the delegates of forty-four nations, representing 80 per cent of the world's population.

At the close of the Conference the recommendations were accepted by President Roosevelt in the name of the people of the United States, and, as soon as Mr Richard Law, Under-Secretary for Foreign Affairs, who led the British delegation, had reported to the Cabinet, Mr Eden, Foreign Secretary, announced in the House of Commons that the findings and recommendations had been accepted as far as the United Kingdom was concerned. An Interim Commission was set up to draw up a formal declaration to be signed by all the United Nations and to prepare for the permanent food and agriculture organisation. It is expected that the Report of the Interim Commission will be published by the time this article appears in print.

It should be noted that this Conference was not concerned with food during the war or with food in connection with post-war relief of the occupied countries of Europe. Post-war relief is being dealt with by U.N.R.R.A. The plan outlined is for a permanent world food policy. It was necessary to have the permanent world food policy outlined before the war finishes so that the war food policy and post-war relief might be adjusted to dovetail into the permanent policy and so avoid the dislocation and slump which followed the last war.

THE ECONOMIC IMPLICATIONS OF THE NEW WORLD FOOD POLICY.

As President Roosevelt expressed it, there has never been sufficient food to feed all the people as human beings should be fed. Even in the most advanced countries, home production plus imports fall short of consumption requirements. The following table gives the official estimates of the extent to which the production of certain foodstuffs would need to be increased in the United States to provide a diet on the health standard for the whole population :—

[TABLE.

**CROP ACREAGE AND LIVE STOCK PRODUCTION REQUIRED FOR
OPTIMUM NUTRITION IN THE UNITED STATES.**

Commodity.	Actual acreage for domestic use, 1936-1940.	Required acreage ¹ for "best adapted diet."	
	Thousand acres.	Thousand acres.	Percentage increase on actual figure.
Truck crops . . .	4,144	7,257	75
Hay . . .	69,469	90,258	30
Fruits . . .	4,269	5,083	19
Beans, peas, nuts . . .	4,484	5,203	16
Potatoes . . .	3,949	4,477	13
Sugar, syrup . . .	1,510	1,659	10
Feed grains . . .	148,252	161,781	9
Food grains . . .	62,463	63,359	1
Miscellaneous crops . . .	12,781	12,085	..
Total crop acreage	311,321	351,162	13
	Actual number of livestock for domestic use, 1936-1940.	Required number of livestock for "best adapted diet."	
	Millions.	Millions.	Percentage increase on actual figure.
Milk cows . . .	23.9	33.3	39
Hens (for eggs) . . .	369.0	452.9	23
Meat animals slaught- ered—			
Sheep and lambs . . .	21.9	25.5	16
Hogs . . .	60.5	69.3	15
Chickens . . .	644.0	699.5	9
Beef cattle . . .	15.2	16.2	7
Veal calves . . .	9.6	10.1	5

¹ Normal yields assumed; acreages listed make no provision for exports.

This agricultural programme, based on nutritional needs, would involve an additional forty million acres to be devoted to food and feeding-stuff crops.

In Britain, no such accurate estimates have so far been made. A Committee of Peers, representing all political parties, in a report on post-war agriculture made the following estimates of the

6 RECOMMENDATIONS OF THE UNITED NATIONS CONFERENCE.

additional foodstuffs needed for the proper nutrition of the whole population of this country :—

Fruit	.	.	.	.	.	70 per cent.
Milk	.	.	.	.	.	65 "
Vegetables	.	.	.	.	.	60 "
Eggs	.	.	.	.	.	60 "
Meat	.	.	.	.	.	25 "

Britain and America are two of the best-fed countries in the world. The increases needed in poorer countries are greater. The kind of additional food needed would, of course, vary in different countries according to national food resources and national dietary habits. Accurate estimates have not yet been made for the majority of countries, but, according to rough estimates made by a group of agriculturists and economists in the United States, world production of the protective foods—i.e., fruit, vegetables, and animal products—would need to be more than doubled to meet the food requirements of the world population on a health standard. There would also need to be a considerable increase in cereals.

It is obvious that this world food policy based on human needs will put the producer for many years ahead on a sellers' market. There will be no slump in agriculture after this war as there was after the last. The conflict between producers and consumers can be reconciled. Increased output of agriculture means better food for the poor and improved national health. The expansion of agriculture will help to bring prosperity to urban industries. In the majority of farms in the United Kingdom, buildings are obsolete in design. In many, water supplies are inadequate. In many more there is a lack of electricity for power and light. Hygienic housing on a modern standard is needed for farm workers. The expansion of dairying, poultry, and pigs will call for a great amount of new equipment. There will thus be an extension of the market for industrial products needed for agriculture. The need for such industrial products in countries like India and China will, of course, be far greater than in the United Kingdom. Then prosperity in agriculture will increase the purchasing power of food producers and so expand the market for all kinds of consumer goods needed for a higher standard of living. This is a big potential market. There are more people engaged in food production throughout the world than in all other industries put together. The trade in food, the largest trade in the world, will be doubled. The new food plan will, therefore, bring about agricultural and commercial prosperity in an expanding world economy. The pre-war restriction policy brought about stagnation of trade with land lying idle when people needed food, and millions of unemployed in other industries when agriculture needed industrial products to make it efficient and give its workers a decent standard of living. Under the new expansion policy, the workers in the towns and the workers on the land will be employed creating the new wealth needed to lift them both out of their poverty.

For the last hundred years schemes to help agriculture were

considered on the assumption that the farmer could get something only at the expense of the consumer or the taxpayer, and that British agriculture could expand only at the expense of the exporting industry or of the food-exporting countries. The new scheme is based on the assumption that the well-being of the consumer and the expansion of trade and industry depends upon an expanding and prosperous agriculture. It is now recognised that peace is indivisible. The Food and Agriculture Conference has established the principle that prosperity is indivisible. World prosperity is impossible unless agriculture, the world's basic industry, is prosperous.

It would be too much to hope that this vast new scheme will go through without opposition. Some who are reluctant to see change of any kind will oppose it. Others may oppose it because the changes suggested are not radical enough. Changes are inevitable. This new world food plan will be the self-starter to set going a movement for the orderly evolution of a better social and economic system. It will bring immediate benefits to the great majority of people, and will not adversely affect any legitimate existing interests. Some will think that though the plan is desirable, it will be impossible to find the money needed to carry it through. Any scheme which is desirable and physically possible is financially possible. The creation of new credits on a world scale will be needed, but the great new real wealth which will be created will balance the credits and convert them into real money. Much of the opposition will be based on misunderstanding. Farmers, who will be the first to benefit, should take a leading part in creating the well-informed public opinion necessary to enable the scheme to be carried through with the minimum of opposition.

THE EFFECT OF THE NEW POLICY ON BRITISH AGRICULTURE.

The new world food policy based on human needs instead of on economic demand makes a definite long-range policy not only possible but necessary. The economic demand for the relatively expensive protective foods varies with changes in purchasing power brought about by slumps and booms in trade. The nutritional needs of the people, on the other hand, are constant, varying only with changes in the total population. The amounts of the commonly used basic foods needed for the proper nourishment of the whole population can be estimated. Then, after consultation with the world food and agriculture organisation with regard to exportable surpluses from other countries, what has to be imported and what home produced can be decided. British agriculture policy can then be planned according to what has to be produced at home.

There is a world shortage of protective foods—viz., animal products, fruits, and vegetables. These are the branches of agriculture which will need to be expanded in Britain. Fortunately, this was the direction in which British farming has, for a long time, been moving. In pre-war days these constituted 78 per cent of

the total money value of agricultural output in England and Wales and over 80 per cent in Scotland. If all or the greater part of the increased supply of animal products and vegetables are to be home produced, a considerable reorganisation of the industry will be necessary. The greatly increased income of agriculture will warrant the capital expense of reorganisation. A decision on what is to be imported and what produced at home should be reached as early as possible so that the industry may begin to adapt itself to permanent post-war needs.

The long-term policy will put an end to dumping. As a matter of fact, there will be little occasion for dumping. The consumption of protective foods will be increased in all countries, in some of them to a much greater extent than in Britain. Even wheat, the foodstuff which has caused most trouble in the past, will, for a time at least, be in short supply. In pre-war days only about 5 per cent of the total wheat produced in the world came on to the international market. A relatively small change in total world production, therefore, caused a big change in the exportable surplus with a corresponding change in price. Wheat-exporting countries will need to devote some of their wheat lands to the production of protective foods. Further, the day of cheap wheat production from virgin soils is drawing to a close. It is probable that in the future with the combine harvester wheat may be grown in parts of Britain as cheaply as in Canada or Australia. But, even if there should be a temporary world surplus of wheat owing to a bumper crop, it will not upset the markets because the world food and agriculture organisation will have the power to purchase surplus wheat and hold buffer stocks to stabilise the market.

In the same way the Ministry of Food or a National Food Board, if some such body be established (see below), will take off the home market any seasonal surplus. With the great advances made in food preservation practically every foodstuff can be conserved and stored. A reservoir of foodstuffs will be an essential feature of the post-war food plan. It will thus be possible to offer the farmer a guaranteed market and relieve him of the fear of the bottom coming out of the market through dumping or through a bumper crop as used to happen not infrequently, for example, in the case of potatoes before the institution of the Potato Marketing Board.

The prices to the farmer will need to be high enough to call forth the amounts of the different foodstuffs needed. With the expansion of British agriculture which the new policy makes necessary, the price offered will need to be higher, relative to the cost of other commodities, than it was in pre-war days. But this does not involve any subsidies to the farmer. The nation needs the food, and, if it pays only the price necessary to call forth the amount needed, it is getting it at the cheapest price. To enable the poor to get sufficient for their needs, the price paid to the farmer will, in some cases, need to be stepped down to the wholesaler, but it is obvious that this procedure involves subsidising not the producer but the consumer.

The fixing of the price to be offered to the farmer may raise difficult problems. The nation wishes to get its food as cheaply as possible. The more efficient agriculture is, the cheaper will the nation get its food. But, as has been pointed out on page 6, there is a very big capital expenditure needed to make the industry efficient. For the last hundred years or so, agricultural income has not been sufficient to maintain buildings, equipment, and land in proper condition. This is one of the strongest arguments for land nationalisation. Whether the land be nationalised or not, the nation must pay directly or indirectly for the improvements needed. In the opinion of the writer, the job will be done quicker and cheaper by those actually engaged in the industry than by a new branch of the civil service which would be necessary under a scheme of nationalisation. If the land be not nationalised, the additional capital must be provided either in the form of grants—*e.g.*, for draining, liming, and water supplies as at present—and, in addition, for reconstruction of buildings and new equipment, or the price paid for agricultural products must be high enough to enable farmers to carry out the improvements by arrangement with landlords or to pay rents which will justify the expenditure by the owner. If there be an assurance of prosperity for efficient agriculture, there should be no difficulty in the industry finding the necessary capital.

Safeguards will be needed in the form of the continuation of Agricultural Executive Committees or the extension of the functions of the Land Court to ensure that the additional money coming into the industry in the form of higher prices is devoted to the improvements needed to make the industry efficient. Any landlord or tenant unable or unwilling to carry out the necessary improvements should be dispossessed as is being done under present war conditions. Farmers who are fortunate enough to have well-equipped farms may, in the first two or three years, make profits greater than what is needed to give a return on capital expenditure on improvements. This can be dealt with by an adjustment of income tax. With these and other safeguards which can be devised, there need be no danger of agriculture being treated with undue generosity at the expense of the rest of the community. Money devoted to making agriculture efficient should be considered as a national investment, because the benefits will ultimately accrue to the consumer. With increased efficiency the cost of production will fall, and the nation will get its food at lower cost. These comments on price are made merely to indicate the complexity and difficulty of this fundamental aspect of a long-term policy.

The nature of the national organisation needed to apply the new food policy will vary in different countries according to their economic structure. The writer has outlined elsewhere an illustration of the kind of organisation which would suit this country.¹ It should be one which would evolve from the war-time measures. And, as far as is convenient, it should make use of pre-war organisations and channels of trade so that the end desired may be achieved with the minimum dislocation of business.

¹ "Food and the People." Pilot Press, London, 1943.

Either the Ministry of Food, adapted to peace-time requirements, or a new National Food Board could be the chief executive authority. If a National Board were appointed, it would be responsible for maintaining the national larder and arranging that sufficient of the essential foods for health was available within the purchasing power of everybody. Funds from the common purse would be necessary to bridge the gulf between what the Board needs to pay for the food and at what it would need to sell it to the wholesaler to enable a diet adequate for health to be brought within the purchasing power of the poorest family by the cheapest method of distribution. The Ministry of Food receives well over £100 million per annum for this purpose.

The National Board would exercise its function through Marketing Boards, each dealing with one commodity—*e.g.*, potatoes—or a group of related commodities—*e.g.*, milk and dairy produce. Pre-war Agricultural Marketing Boards would fit into the scheme with little change. They should be able, with the powers given them, to organise marketing to reduce the wide gap between what the farmer gets and what the consumer pays.

It has been suggested that farmers and the general public cannot get the benefits of a scheme of this kind without being controlled by officials. There is a danger that agriculture and other industries after the war may become shackled by a bureaucracy greedy for power. It is unnecessary to give the National Food Board powers of compulsion over producers. The offer of a remunerative price will call forth all the food needed. Production can be controlled by the price offered. If the prices for the various commodities required are known, and it is known that there will be no sudden change in the ratio of these prices to the price of other commodities, farmers can then decide for themselves what it will be most profitable for them to produce. If sufficient of any given foodstuff is not being produced, then the price offered must be raised. If more is being produced at the price offered, then the Board will be justified in gradually reducing the price until the most inefficient producers are eliminated. A guaranteed market with price control will increase efficiency in agriculture more rapidly than an army of officials and inspectors. It was a guaranteed market and the good prices offered which has brought about the great increase in production and the increase in efficiency during the present war.

This new food policy based on human needs recommended by the United Nations Conference on Food and Agriculture, and its acceptance by the Government, afford the means of establishing a prosperous and stable agriculture. For the first time in the history of agriculture in this country, the producer, the consumer, and the trader can unite in forwarding a food policy which will be in the interest of all concerned.

THE UTILISATION OF SURPLUS STRAW.

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OWING to the modifications which have been introduced into systems of cropping as a result of the war, there is a large surplus of straw on many farms. A proportion of the wheat and oat straw can be and is being utilised for the manufacture of paper, but the demands of the paper-mills are not sufficient to absorb the whole of the excess. Of the alternative methods which have been used or suggested for dealing with the problem, the majority centre round the conversion of the material to humus with a view to contributing to the maintenance of soil fertility.

STRAW, HUMUS, AND SOIL FERTILITY.

The association of humus with fertility was early recognised, and its importance in this respect is now generally admitted. Factors which reduce the percentage of humus in a soil will also reduce its fertility and crop-producing capacity. Among these are the war-time practices of taking several successive grain crops and of applying lime without the addition of organic manures. It is generally believed that the system of war-time cropping is depleting the soil of its organic matter, and it is therefore anticipated that unless steps are taken to prevent it there will be a progressive fall in the crop-producing capacity of the land. Prudent farmers are therefore considering methods by which the organic matter which has been and is being used up can be replaced. Farmyard manure is scarce, and most of it is probably of rather poor quality owing to the rationing of live stock. The most obvious source of humus-forming substances is the straw surplus which the emergency cropping programme has created. Other sources of materials suitable for conversion into humus are available only in relatively small quantities.

Owing to the fact that its composition and characteristics are extremely variable it is difficult to give an adequate definition of humus. It is not a single well-defined chemical compound; rather is it a group of ill-defined substances. It is continuously being augmented by manuring (additions of farmyard manure, green manure, and crop residues—*e.g.*, stubble), and as continuously being broken down by the activity of micro-organisms (bacteria and fungi). That its composition must show extreme variations, therefore, is obvious. Its other characteristics are no less variable. For example, its decomposability upon which soil fertility is

partially dependent will be determined in considerable degree by its age. In the older material the easily decomposable substances will have disappeared, and only the resistant compounds will remain.

Two important humus constituents of the resistant type are lignin and the substances contained in the cells of bacteria and fungi. The lignin is derived from plant tissue in which it is closely associated with the materials which make up the walls of the tissue cells. The percentage of this compound increases as the plant matures. Lignin is present in particularly large amounts in woody tissue. It may seem surprising that the cells of bacteria and fungi should constitute an appreciable proportion of humic material, but the fact that humus is both formed and decomposed by micro-organisms accounts for their presence in large numbers. In the early stages of humus formation particularly, large quantities of readily decomposable organic material are frequently broken down by a microflora which becomes both numerous and varied. A high proportion of the nitrogen of humus occurs in the cells of micro-organisms. As long as these remain alive, their cell contents, of course, undergo no decomposition. When they die, however, their cell substance is broken down and converted by other micro-organisms to forms which can be utilised by fresh generations of plants, bacteria, and fungi. Generally the process of decay is rather slow, especially in the case of the cell constituents of those bacteria and fungi which form resting bodies called spores.

FORMATION AND FUNCTIONS OF HUMUS.

The agencies which take part in the formation and decomposition of humus include members of both the plant and animal kingdoms. Earthworms, insects, insect larvæ, and similar organisms are active in the physical break-up of organic substances, and assist in mixing them intimately with the other soil constituents. The major part of the decomposition, however, is attributable to the action of fungi and bacteria. As a rule, the former are active in more acid conditions than the latter, but their growth is generally restricted by absence of air; bacteria can function either in presence or in absence of oxygen. There is some evidence that purely chemical reactions may also make a contribution to the formation of humus. Organic matter tends to disappear more rapidly from soils under crop than from those which are kept free from vegetation.

The main function of humus is to provide a reservoir of food material for plants and soil micro-organisms. From the point of view of the plant, the fact that humus is slowly decomposable is not entirely a disadvantage, because it ensures that food supplies are rendered available in moderate quantities and continuously over a considerable period. As humus decomposes phosphoric acid and potash become available for plant growth. The more important changes involved in humus decomposition, however, centre round the carbon and nitrogen of the organic matter. The

nitrogen is ultimately converted to ammonia, which is then oxidised by the nitrifying bacteria to nitrites and nitrates. In the latter form it can be absorbed by most plants through their roots. The carbon of the humus finally appears as carbon dioxide, of which enormous quantities are produced in the soil. This is a factor in plant nutrition which is frequently underrated. Its importance may be inferred from the fact that it has been calculated that if the whole of the carbon dioxide produced in soil in the course of a year from the decomposition of humus could be concentrated on the soil surface it would form a layer over one foot deep. In sunlight the carbon dioxide is assimilated in large quantities by green plants through their leaves; in solution in the soil water it helps to dissolve mineral substances.

In addition to its function in supplying nutrients to plants and soil micro-organisms, humus exerts an important influence on the mechanical condition of the soil. It tends to bind together and consolidate light land and to open up heavy soils and render them more permeable to water and more easily worked. It also increases the capacity of light soils to retain plant nutrients and water and assists them to withstand drought.

FACTORS WHICH CONTROL THE RATE OF STRAW DECOMPOSITION.

A large proportion of the dry matter in straw consists of cellulose. This compound is the main constituent of the framework of plants; the cell walls are largely composed of it. In straw, however, it is accompanied by more easily decomposable substances as well as more resistant bodies such as lignin. Cellulose itself offers a high degree of resistance to the action of chemical reagents, but it is broken down with fair rapidity by certain fungi and bacteria. When straw is encouraged to rot before it is applied to the soil the processes employed generally aim at the complete destruction of the readily decomposable ingredients and the partial breakdown of the more-resistant cellulose. When it is ready to be incorporated in the soil the material should be brown in colour, and the straw, while still retaining its structure, should have lost most of its tensile strength. It is advisable that most of the easily decomposed organic compounds in straw should be eliminated before the material is added to the soil, and certainly some time before a crop is sown or planted. The ploughing in of such substances in considerable amounts will cause a rapid multiplication of micro-organisms which will take up not only the nitrogen of the straw but also the available nitrogen in the soil. The result will be that the soil's stocks of available nitrogen will rapidly become immobilised in the cells of the organisms, and the crop will suffer from nitrogen starvation.

A knowledge of the factors which influence the rate at which straw undergoes decomposition is essential to the proper understanding of the methods which have been suggested for the conversion of straw to humus. It should be remembered that the

cellulose in straw is not present in a state of purity. It is intimately associated with lignin, which tends to protect it from attack. Partly because the proportion of lignin increases as the crop ripens, straw at harvest offers greater resistance to rotting than it would if ploughed in while still green. The relatively low moisture content of ripe straw, however, is also a potent factor retarding its rate of decomposition. The micro-organisms responsible for rotting require a certain percentage of moisture in the medium in which they grow; the bacteria demand more than the fungi. The drying of grain and straw preparatory to stacking is designed to reduce the moisture content to a point at which mould will no longer develop. To bring straw into a condition in which it will undergo rapid decomposition as much as 800 gallons of water per ton must be added. Not only, however, is the moisture content of well-ripened straw too low to permit decomposition, but owing to the presence of waxy materials on its surface straw is very difficult to wet.

Micro-organisms, like plants, require to be supplied with adequate quantities of nitrogen. Straw contains a relatively small amount of nitrogen—considerably less than the quantity demanded by the bacteria and fungi concerned in its breakdown. This is a third reason why ripened straw decomposes more slowly than that ploughed in while still green. As the crop ripens most of the nitrogen is transferred from the straw to the grain. Oat and barley straws each contain about 0.5 per cent, and wheat straw about 0.3 per cent of nitrogen in the dry matter. These quantities must be raised to 1.2 per cent before active rotting will set in. Owing to losses of organic matter which occur in the course of decomposition, well-rotted straw generally contains about 2 per cent nitrogen in the dry matter. During rotting the nitrogen is largely assimilated by the bacteria and fungi, and remains locked up in them until they die and their cells undergo decomposition.

As the main object of rotting straw is to provide humus, some account must be taken of the quality of the humus formed under different conditions. Humus can be produced from straw either in presence or in absence of air, but the product of decomposition in presence of air is superior to that formed when air is excluded. Amongst other characteristics it is more easily decomposed. The humus formed when air is lacking is highly resistant to further attack. The rotting of straw in presence of air has the further advantage that it rapidly eliminates the very readily decomposable organic compounds which exert such injurious influences upon plant growth. A consequence of the vigorous breakdown of these compounds is that the temperature tends to rise, especially if the straw is kept in large heaps. This tends to accelerate decomposition. Heating must, however, be carefully regulated, otherwise losses of organic matter may be excessive, and if it is very intense a dark-coloured or black material is formed which decomposes extremely slowly and is of comparatively little value. The temperature of decomposing straw can be regulated by restricting the supply of air by compressing the material or saturating it with water.

METHODS OF UTILISING STRAW.

The methods which have been tried or suggested for utilising straw are rather varied in character, ranging as they do from composting to the construction of shelters for animals. It must, however, be admitted that, on the whole, the subject is one about which comparatively little exact information exists, and some of the methods are only the barest suggestions, the practicability of which still requires to be tested.

Composting.—The process about which most information is available is composting. This term is applied quite generally to the method by which organic materials are mixed together in suitable proportions with or without fertilisers, and encouraged to undergo a preliminary decomposition with the object of converting them to a form in which they can most advantageously be added to the soil. The general principles applicable to the composting of straw, in so far as they are understood, have already been outlined.

The compost heap may either be built on the surface of the soil or in an excavation specially dug. If it is placed against an elevated bank it may be filled from the higher side and emptied from the lower, thus economising labour. In preparing a sunk foundation the area may be ploughed and the loose soil thrown outwards. It is almost essential to construct the heap near an adequate water supply.

The foundation of the compost heap is first covered with a layer of straw about one foot deep, which is sprinkled with water and left for two to three days to undergo a preliminary fermentation. This treatment is believed to make the straw more easy to wet, and the slightly increased temperature produced has the advantage of giving the subsequent rotting process a good start. It cannot be said, however, that the problem of wetting straw for composting has yet been satisfactorily solved, or that it is always carried out in the manner described. In some cases the water is added more rapidly, and the whole quantity (800 gallons per ton) may be applied in three or four doses with short intervals between. There is little doubt that if straw can be broken or cut into small pieces it will absorb water more readily. The value of chemical wetting agents in dealing with this problem also deserves to be investigated.

Whether the straw has had a preliminary moistening or not the next stage is the addition of the source of nitrogen. The best compound for this purpose is calcium cyanamide, which unfortunately has not been available since the early stages of the war. Sulphate of ammonia may be employed as a substitute, but in this case lime (ground limestone or hydrated lime, but not burnt lime) should be added to neutralise the acid formed when the ammonia is assimilated by the bacteria and fungi. The sulphate of ammonia ($\frac{1}{2}$ to 1 cwt. per ton of straw) may be sprinkled on the surface of the layer and washed in with a portion of the water used for soaking the straw; the smaller quantity may be added to oat and barley, the larger to wheat straw. The lime is then distributed over the surface of the layer and immediately washed in. If the sulphate

of ammonia and lime are allowed to remain in contact on the surface of the straw, ammonia will be liberated and will escape into the atmosphere. There is less danger of loss of ammonia if the mixture is made within the straw layer. Nitrate should not be used as a source of nitrogen owing to the fact that in a heap there is a risk that at least a portion of it will be washed down until it reaches a level at which the heap is saturated and air is excluded. Under these conditions the nitrate will be denitrified—*i.e.*, converted to gaseous nitrogen and lost. Materials rich in nitrogen, such as short grass clippings and poultry manure, may with advantage be incorporated in straw compost. Liquid manure is a very favourable source of nitrogen. Generally about the maximum quantity of 800 gallons per ton required to wet the straw will be needed to supply the requisite amount of nitrogen for composting. Where liquid manure is available continuously in the form of drainage from byres, it is better to apply it direct to the compost heap rather than to store it in a tank. During storage the nitrogen is converted to ammonia, a large proportion of which will be lost when the tank is emptied. The best arrangement is to allow the manure to flow more or less continuously over the straw heap. In order to avoid excessive dilution it will be necessary to allow the water used for washing the byre to run to waste. An arrangement similar to that described in Ministry of Agriculture Advisory Leaflet No. 232 may be employed for this purpose. Peat is not particularly suitable for addition to the compost heap. It contains about two to five times as much nitrogen as straw, but is very resistant and decomposes extremely slowly. It will not accelerate the rotting of the straw and should therefore be used as a direct addition to the soil.

As soon as the necessary additions of nitrogenous compounds and water have been made to the first layer of straw a fresh layer is placed on top of it, and the process is repeated until the heap reaches a height of about six feet. The straw should not be compressed too much at this stage, but when the temperature shows unmistakable signs of rising, pressure should be brought to bear on the heap to retard further heating, and, if necessary, more water may be added. Exact information on the temperature permissible in the heap is not available, but as a rough guide the opinion may be expressed that heating should not be allowed to proceed unchecked after the temperature reaches about 120° to 130° F.

Almost all kinds of vegetable waste material may be added to the compost heap with the exception of woody tissue and roots of crucifers. Wood even in the finely divided condition in which it exists in sawdust is unsuitable. It contains very little nitrogen, decomposes extremely slowly, and causes additions of available nitrogenous fertilisers to be locked up for prolonged periods. Roots of cabbage and related plants are highly resistant to rotting, though the stems of Brussels sprouts, for example, decompose quite rapidly. Roots infected with finger-and-toe should on no account be composted. Vegetable waste, grass cuttings, weeds, and even young

hedge clippings decompose comparatively quickly, leaves and sods more slowly. Sods containing rack will break down with fair rapidity if they are well freed from earth before they are placed on the heap. If this precaution is not taken, portions of the rack are apt to survive the treatment, especially if the sods are large. If chaff is composted, it is likely to prove particularly difficult to wet and will usually contain numerous weed seeds. In order to destroy the latter the temperature should be encouraged to rise by keeping the heap loose and not saturating it with water. Available data suggest that for this purpose the temperature of the compost should be raised to about 150° to 160° F. in the course of the first fortnight. Substances likely to injure or destroy the micro-organisms concerned in the making of compost should not be included in the heap. Disinfectants and preservatives, sheep dip, tar, and creosote fall into this category. Some observers are of the opinion that the addition of a starter of well-rotted dung promotes the decomposition of straw compost. Accurate scientific data bearing on this point are lacking, although instances have been observed which seem to support the view. It is reasonable to suppose that when composting is carried out for the first time in a particular spot the incorporation of a starter may be beneficial. Experience with similar inoculations in other fermentations suggests, however, that where a pit has already been used for the production of satisfactory straw compost the addition of an inoculation of dung is likely to prove unnecessary.

In order to hasten rotting, the turning of the compost heap is sometimes recommended. This will prove to be a laborious operation and it should, if possible, be avoided. The main advantage in addition to acceleration of rotting is that an opportunity is provided for turning the dry 'outsides,' in which owing to lack of moisture rotting is impeded, into the interior of the heap where they will find conditions for decomposition more favourable. As has already been indicated, speed of breakdown is largely a matter of regulation of access of air, and practical methods exist for dealing with this. It would appear to be preferable to attempt to keep the 'outsides' moist rather than to have to undertake the time-consuming operation of turning the heap. A covering of soil may be thrown over the heap, which in this case will require to be built with sloping sides, but the labour involved is not inconsiderable. An enclosure of straw bales arranged in vertical walls is sometimes built; it is filled with straw to the level of the top of the walls and covered by placing a horizontal layer of bales on the straw in the enclosure. Bunched straw could probably also be used to cover the sloped sides and top of the compost heap. Composting will generally take about six months to complete. Summer temperatures promote the decomposition and so shorten the period required, but it is generally more convenient to make compost during the winter. Some advantage may, however, be secured from the heat of summer by starting to compost before the temperature has fallen too low—*e.g.*, in early autumn.

Increased use in Farmyard Manure.—Increased quantities of straw litter for live stock can generally be utilised and made into farmyard manure. The following allowances of straw litter per head per day are recommended by competent authorities:—

For cattle tied in byres	7 lb.
For cattle in covered courts	14 lb.
For cattle in semi-open courts	21 lb.

The figures apply to conditions as they existed before the war, when farmyard manure invariably contained considerable quantities of readily available (chiefly ammoniacal) nitrogen. It can be assumed that the dung produced in war-time is less rich in such compounds. Nevertheless, as long as it contains any ammoniacal nitrogen it should be capable of rotting additional quantities of straw, provided the other conditions necessary for decomposition are fulfilled. The amount of extra straw which can be broken down will depend upon the quantity of readily available nitrogen in the manure. Additions may be made either in the form of extra litter while the dung is still in the courts, or they may be incorporated in the midden when well-rotted dung is carted out. In the construction of middens additional straw can generally be utilised. Layers of moderate thickness may be alternated with layers of manure. Too often one sees quantities of dark-brown liquid draining from dung heaps and indicating serious loss of plant nutrients and humus-forming materials. Such losses can be minimised by building the midden on a deep foundation of unrotted straw or by absorbing drainings in this or similar materials. Straw which has already been used as thatch or for covering potato-pits may be employed for these purposes.

The proportion of straw used as litter can be raised even beyond the limit set by the available nitrogen of the dung if additional nitrogenous compounds and, when necessary, water are provided. Just as reduced nitrogen in the rations tends to lower the percentage of nitrogen in the dung, so reduced root feeding lowers the moisture content of the manure. Additions of nitrogenous fertilisers and water can be made in much the same manner as in the compost heap. In some cases the nitrogen appears to be the limiting factor, in other instances more water must be added. Some farmers have used one addition, some the other, and some have added both with marked success.

Every opportunity should be taken of making additional quantities of farmyard manure by providing liberal amounts of straw litter in shelters used by cattle in the fields in summer and during the winter months. If structures of this type are kept well bedded the comfort of the animals is enhanced, and they thrive better and make considerable amounts of manure. Shelters for cattle may also be constructed of straw. The walls may be built of bales or they may be composed of straw used to fill a nine to twelve inch space between parallel upright supports of wire-netting. In either case a fence should be provided inside the shelter wall to keep the animals from breaking down the latter.

Walls of bales may be reinforced by fastening them together by means of long upright poles driven into the ground in pairs, one on each side of the wall, and fastened together over the top bales by wire. A part of the enclosure may be roughly roofed over with poles, branches, and straw.

Quantities of extra dung can even be made under sheep, with marked benefit to the animals. In certain parts of the country such methods were being tested even before the outbreak of the present war. They were, however, directed to improving conditions for fattening the sheep rather than utilising straw. Straw shelters were constructed of bales or of bunches attached to hurdles or fences. In individual cases groups of twenty-five to eighty sheep were penned on areas twenty-five by twenty-five yards and kept liberally bedded during the whole period of confinement. The success of this method is largely dependent on keeping conditions underfoot as dry, clean, and comfortable as possible, examining the sheep's feet regularly, and passing them through a foot-bath at intervals not exceeding five days. It can be readily understood that unless the comfort of the sheep is ensured they will not do well. It is claimed, however, that if these matters are given attention the sheep will put on weight more rapidly than those fed in the usual way. From twelve to fifteen inches of dung accumulates in the course of about six months, but it is generally incompletely rotted and must be further decomposed in a midden before it is used on the land. There is no reason to believe that if this is done the dung made will be inferior to ordinary farmyard manure. Temporary shelters for both cattle and sheep are particularly valuable for utilising surplus straw from outlying and inaccessible fields, thus avoiding the necessity for carting both roots and straw long distances to a steading and dung back to the fields.

Ploughing in.—The most obvious method for returning straw to the soil is to spread it on the surface and plough it in, but this is not always as easy as it may seem. Long straw is difficult to cover, and by its tendency to accumulate in front of the plough increases the difficulties of this implement. Placing the straw in each furrow as it is opened makes covering easier but is too slow and laborious. Chaffed straw or broken straw from combine-harvesters can be ploughed in with less difficulty. Cut straw like short grass is troublesome to handle and necessitates the use of special appliances. Silage cutters have been used for cutting straw and blowers for loading it into carts, while with the combines special spreading attachments assist in distribution.

One of the greatest difficulties in ploughing in long straw is that of fixing or anchoring it. Discing followed by rolling has been employed successfully, and the method of spreading the straw on the surface of the soil and allowing a crop to grow up through it has also been used. Treading the straw into the soil by sheep also serves to fix it, but from the point of view of anchorage the best method of all is to leave most of the straw attached to the soil by its roots—that is, to cut a long stubble at harvest.

The rotting of straw in the soil is regulated by the conditions

already described at the beginning of this article. The supply of moisture will depend largely upon the weather and on the nature of the soil. The latter will not generally be a limiting factor in medium and heavy soils, but in light land it may be, and prolonged drought may retard the breakdown of straw added in large quantities. A supply of nitrogen must, of course, be provided, but if sulphate of ammonia is used the addition of lime will not be required unless the soil is actually deficient in this substance. Nitrogenous fertilisers may with advantage be supplemented by green manures; for this purpose leguminous crops are most suitable owing to their high nitrogen content and to the fact that most of this is obtained from the atmosphere. Air will not be lacking in any except very heavy, poorly drained soils. Owing to the fact that the straw is distributed in rather thin layers and not in large masses as in the compost heap, the decomposition will not produce an appreciable increase of temperature. In ploughing in straw, therefore, it is important to utilise, as far as possible, periods when the soil temperature is slightly raised. The advantage of this factor may be secured by ploughing down the straw as early as possible in autumn. At this season moisture conditions are becoming more advantageous than they are in summer. If it is not to deplete the soil of available nitrogen, it is important that the straw should be well rotted by the spring, and the earlier it is ploughed in the longer the period available for decomposition.

The following are examples of the application of principles and methods described in this section :—

The method of spreading straw between the rows of cabbage and kale in June and July has been employed successfully in the East of Scotland. Two to three tons per acre are applied along with $1\frac{1}{2}$ cwt. sulphate of ammonia. The mulching effect of the organic matter may be expected to benefit the crop. The straw is trodden into the soil by sheep in November, and the remains of the crop are consumed at the same time. The land is ploughed in January, and by the time of the spring cultivations the straw has entirely disappeared. It has been stated that straw may be applied between the rows of turnips and swedes in a similar manner. It can also be spread on the surface of the soil in turnip fields where the crop is being eaten by sheep. The break immediately behind that being consumed is the most suitable for treatment. The suggestion has also been made that straw may be trodden in by sheep on the groups of four to eight drills, from which the roots are driven off before the remainder of the crop is consumed.

Straw may be spread on the surface of the soil immediately after a hay crop is cut and ricked, and the foggage which grows up through it may be ploughed down with it in autumn. A similar treatment can be applied to three-years' clover leas in the middle of the last summer. In both cases the crop may be eaten off before the land is ploughed.

Of all the methods for dealing with the straw surplus that which seems most logical and makes the lowest demand upon labour is the ploughing in of a stubble left long at harvest for this

purpose. There seems to be little point in cutting, stooking, carting, stacking, and thrashing cereal straw merely to cart it back to the field and plough it in if the same result can be achieved and most of the labour involved eliminated by other means. The practicability of the method depends in the first instance on the capacity of the crop to remain upright until harvest. The length of stubble which can be left by the ordinary binder will depend upon the length of the crop and the length of sheaf which can be successfully handled. The combines do not impose such limitations, and the method is specially suited to harvesting by these machines. The nitrogen content of the straw can be raised to the level at which rotting will take place with reasonable rapidity by applications of sulphate of ammonia, but increased quantities of valuable humus-forming materials may be incorporated in the soil at the same time by supplementing or replacing the fertiliser by a green manure crop ploughed in with the straw by means of a digger plough. The green manure crop must be undersown in the cereal.

Cutting a long stubble has the advantage that the green manure crop can be left almost if not quite intact, and little or none of it should appear in the sheaf bottom. The green manure crop should preferably be leguminous, and it should be capable of establishing itself readily in the cereal without interfering with the development of the latter and of making rapid growth after harvest and before the growing season ends. Mixtures of Italian and perennial ryegrass with red clover have been used for green manuring under similar conditions to those which have been outlined, but these do not exhaust the possibilities. Experimental plots are being laid down over a wide area in the South-East of Scotland during the current year to test certain other green manure crops for this purpose. It is, of course, recognised that the success or failure of operations of this type will always be dependent in large measure upon weather conditions.

RETURNS FROM APPLICATIONS OF DECOMPOSING STRAW.

In conclusion, a word of caution is necessary regarding the immediate returns to be expected from applications of compost or straw allowed to rot in the soil. In the year of application it is clear that these substances cannot be expected to yield results equal to those obtainable from additions of sulphate of ammonia equivalent to those incorporated in or with the straw. Further, it should not be assumed that compost or straw ploughed in with the usual quantity of added nitrogen is comparable in all respects with well-made dung. The main reason is that the nitrogen added to the straw is the quantity calculated to induce rotting only, and there is no surplus over and above this amount. In farmyard manure on the other hand, nitrogen from fæces and urine is generally present in quantities greater than that required to rot the straw. The excess appears mainly as ammonia, and it is largely to this that the beneficial effects of farmyard manure in the year

of application are attributable. Owing to the fact that only the quantity of nitrogen necessary to induce active rotting is added to compost, this material generally contains little or no free ammonia—a fact which is an advantage in the handling of the manure, for every time dung is turned it loses about 20 per cent of its nitrogen owing to escape of ammonia. Because of the absence of readily available nitrogenous compounds a response in the first year equal to that obtained from sulphate of ammonia or dung of good quality cannot be expected to follow applications of compost or straw. The nitrogen which at first is largely in the cells of the bacteria and fungi is only liberated slowly. It will, however, ultimately become available for plant growth, and in the meantime the compost will furnish an abundant supply of humus-forming substances, with consequent benefits to the soil and the crop. If more immediate results are required, nitrogenous fertilisers must be applied to the crop in the usual quantities. In adding sulphate of ammonia to straw ploughed in, it appears probable that the best method is to give the calculated quantities of nitrogenous fertiliser for rotting the straw at the time the material is ploughed down and to supplement this with a further dressing in the spring.

DRY STONE DYKING.

By Colonel F. RAINSFORD-HANNAY, C.M.G., D.S.O.,
of Kirkdale

THE face of rural Britain has changed vastly during four and a half years of war. Nearly every acre not covered with buildings, roads, forests, or aerodromes is being cultivated to produce some sort of food. And where the land cannot be made to grow a crop or feed a sheep economically, it still has to produce, the deficiencies being helped out by grants.

The rotations of crop and re-seeding will result in splendid fields of grass, where for years to come cattle and sheep may be raised in larger numbers than before.

Properly managed grazing requires proper fences, which brings me to the subject of this article.

Of all fences, it is generally conceded that well-built stone walls are the best. Let us enumerate some of their virtues as against other forms of fence, and from now on we will call them dry stone dykes.

A well-built dry stone dyke :—

- Is durable ; many in Scotland have been standing for 150 years with but little repair, and look like standing for as long again.
- Is absolutely stock-proof to all but black-faced sheep, and if 5 ft. 3 in. high it is stock-proof against them.
- It gives shelter.
- It occupies very little ground, 34 in., including foundation, is its greatest width at the base. It can be made rabbit-proof.
- It requires no imported material, and uses up stone on the spot.
- It runs over ground where no hedge can grow and where no post can be driven.
- It requires very little upkeep.
- It can be surmounted by any careful person.
- It cannot be burnt.

A well-tended hedge is a delight to the eye, and where the soil is good and stones cannot be got it is the only fence that should be allowed in this old country. It fulfils several of the *desiderata* of a good fence, but it takes several years after planting to become a fence in itself. It gives less shelter than a dyke in winter when shelter is wanted. With its ditch and shade it may occupy up to 12 ft. of arable ground, and it wants annual attention.

Wire fencing, in its several forms, has the considerable merit of being quickly put up and of occupying very little ground. It is also stock-proof, and lasts as long as its posts. Railways erect very good wire fences of $3\frac{1}{2}$ in. or 4 in. squared larch posts with six strands of wire. But a wire fence gives no shelter, is easily broken by trespassers, and cannot be erected on hard rocky ground. Also, a weakness in one part affects many yards on either side.

When the Enclosure Acts were passed from 1710 onwards, fences of all kinds appeared all over these islands, and the value of land and the profits therefrom increased three-fold and more. The work took many years to complete, and the advent of railways made more work necessary, but by the middle of the nineteenth century nearly all the land had been fenced, most of it very well, and the more recent fencing up to 1850, with the experience behind it, seems to be the best.

Dry stone dyking, in a comprehensive way, began in about 1712, when the brothers M'Kie of Palgown, in the extreme west of the Stewartry of Kirkcudbright, set the example by starting to enclose many square miles of otherwise useless moors. They allowed free-rented pieces of land to people who would work for them in the summer. Early in summer these people with their women and children took to the hills with poles, tents, and blankets. In two or three days they had built themselves turf huts, and heather formed their beds. The brothers themselves superintended, and in a very few years the work, which at first looked like the labours of Hercules, was done.

But in 1723 a lot of discontented people, gypsies mostly, and smugglers, who found their pack-trails barred, started to throw down the dykes all over Galloway. They called themselves 'The Levellers,' and a lot of damage was done, especially between Castle Douglas and Kirkcudbright. Finally the military were called in. There was no bloodshed, and the marauders decided to desist.

There are dykes standing now which escaped the attention of the Levellers, notably those at Palgown and at Robertson in Borgue parish.

This article does not advocate the building of new dykes. They are not necessary, for the land is dyked now. But bodies such as Railway Companies, Corporations owning land, and County Councils, which can take long views and do not have to pay death duties, will be well advised to make their fences of dykes when new ones are required; along new roads, for instance, where stone is easily got out of cuttings. But for the vast majority of us farmers, all we need do is to put some thorough work into our existing dykes, topping them with level copes and rebuilding gaps. Having done that, we should register a vow to oversee them during a week or two in summer every year.

Some of us may think it economical to put up wire inside a derelict dyke. It is quite stupid to do such a thing. It certainly costs less, about two-thirds the cost of putting the stones into a 4 ft. 9 in. dyke, and goes up in a day or two, but it reduces the arable ground appreciably, the fallen stones create a harbour for

weeds and vermin, and the hidden stones damage the implements of agriculture. This seems to be a case for a little fatherly control by County Agricultural Committees.

When we ruefully contemplate a derelict dyke, derelict because of our forbears' neglect and our own, we can comfort ourselves with the knowledge that nearly two-thirds of the labour for its renewal has already been wrought. The stones are there, distributed along the line, and the quarrying of them and the carting of them has been done and paid for long ago.

With two real dykers working a nine-hour day that dyke should go up at the rate of twelve yards a day and be 4 ft. 9 in. high. That is fast work, and in practice they will not do so much, for they may have various difficulties to meet, opening a drain to flow properly, digging out roots, and so on. Also they will want additional stones from some nearby bing or roadside quarry. One good cartful a day should be enough.

But it should be seldom that a dyke requires renewing all along its length. In places the foundations may have slipped in the course of a century, caused by water or tree roots, and in places copestones will have fallen, pushed off by hikers or horses. The latter places are quickly put right, but the dyker will not like to leave his work at the foundation until the cause of the disrepair has been removed. He will also be careful to make the top as level as he can, for it is always the irregular spots that attract attention of both two-legged and four-legged animals.

We never pause to consider what we owe to our dykes and hedges, and to our forbears who established them. Those old stalwarts, looking down from some heavenly enclosure on their work, may well shake their halos mournfully at the general neglect of what they did so well, and perhaps they may quote to each other from Ecclesiastes ii. 18 and 19, where the Preacher is dismal indeed.

It is not so bad as all that—nothing like—for there are thousands of miles of dykes standing yet, many of them excellent : 7000 miles in the Stewartry alone. And if we are to believe the Reverend Samuel Smith (we meet him later in this article), our forbears may not be so blameless as they look under their halos.

But quite frankly, we do treat our dykes badly. We pull out a wide gap to let through some snorting juggernaut of a threshing mill ; and don't rebuild for weeks. With our nose in the air, we walk straight past a spot where one copestone has been pushed off by a horse, or a hiker, or a beater, when one heave of our brawny shoulders would have put up that stone and secured the place for years to come.

We are so apt to regard our dykes as permanencies, and feel sore if a gap appears after a century. They don't last for ever, any more than does any other work of men's hands, but they repay in full measure work done on them. In fact, a repaired dyke is better than ever before, and that is more than can be said of anything else that I know of, for the ground it stands on has been consolidated by the weight of stone for over a century.

No farming papers ever mention them, or dykers, or hedges, or

hedgers. Every week we read reams about ensilage, as if no one had ever filled a silo before; about manures, seeds, and what not, and there are wonderful lists of wonderful prices at wonderful sales. Both buyers and sellers might spare half of one per cent of these prices in putting their fences in much better order.

After this digression let us resume on another plane.

The reader may say, "Granted that all this about dykes is true, where can I get a dyker? I don't know of any."

An answer to that plaint, true though not helpful, is, "Whose fault is that?" But it was realised that something had to be done about it, and in 1938 subscriptions were raised in the Stewartry to start a dyking competition. The outbreak of war put a brake to this, but in October 1939 the first competition took place on Ford Farm near Bridge-of-Dee. The year 1940 was much too anxious a time, but in October 1941 the second competition came off on Dryburgh Farm three miles east of Castle-Douglas.

There were twenty-eight entries in 1939 and twenty-six in 1941, and nearly half of these were professional dykers. Substantial prizes were given, a Challenge Cup was presented, and the Highland and Agricultural Society presented silver medals in two classes. Some excellent work was done, which, with the big entry of dykers, fairly astonished the pessimists.

In the High Peak district of Derbyshire, stone walling competitions were started in 1937 and in 1938 under County auspices. There was in each year a week's course of instruction followed by the competition. Over fifty men competed each time. Their Dry Stone Walling Association is in abeyance during the war.

Quite lately in Cornwall a dry stone walling competition has been held.

So it seems that, elsewhere than in Galloway, people are realising the value of their dry stone dykes and walls, and are starting to foster the art of building them. It speaks well for the original work if it is only after nearly two centuries that this is being done.

In both years of the Stewartry competition, gaps 19 ft. wide for pairs and 9 ft. wide for single dykers were pulled out at the weaker places of a still fairly serviceable dyke. Foundations were already there, so the men started from the grass. The work lasted five and a half hours.

Petrol restrictions confined us to dykes near a bus route, but next time we will try and find a much more derelict dyke, pull it all out and rebuild, men 'dyking in' with each other at the edges of their tasks. It will probably be a high hill dyke.

The opportunity was taken on both occasions of selling a programme with a foreword about dyking and the specification for the dyke to be rebuilt.

Few can have seen such a specification before, for practically all work for years has been that of repairing gaps. Before we go on to the principles of dyke-building, readers should study the specification for the 1939 competition:—

SPECIFICATION.

Gaps will be rebuilt to this specification. Dyke to be 26 in. wide at the 'lift' immediately above the foundation stones.

From there build to taper gradually to 14 in. wide at the top of the Double, which is to be 3 ft. above the grass.

The height of the dyke to be 4 ft. 2 in.

The covers or first stones on top of the Double to project $1\frac{1}{2}$ in. on either side of the Double.

The Double to be built with both sides brought up together, having the stones properly blocked, laid close together, well *hearted* and packed in the centre. The outer stones to be laid on their flat sides, with their ends generally inward, so as to stretch into the dyke as far as possible for the better building of the same.

The Double to have one set of through-bands long enough to project on both sides.

This set of through-bands to be at 21 in. above the grass at 1 yd. centres or 7 through-bands to the 18 ft. rule.

The cope or single stones above the Double to be well locked together.

Dykers work best in pairs, one on each side. A dry stone dyke varies from 4 ft. to 6 ft., the higher, of course, the better. It can be built 'single' or 'double.' The foundation is first got ready by stripping off turf 2 in. to 6 in. to get a firm base. The shallow trench is packed tight with good stones more or less flat, with enough to provide a scarcement of at least 2 in. on either side of the base of the dyke proper, at the 'lift' as it is called. If the dyke is on a slope the scarcement should be at least 4 in. on the downhill side and little or nothing on the other.

Dykers use a light wooden frame, often two frames, which are set up in the line of the work. These are made to the cross section desired and to the height of the cover band, which might be 3 ft. 4 in. above the grass. A 4 ft. 6 in. dyke would be 26 in. wide at the grass and 14 in. at the top. They stretch strings between the frames parallel to the ground and build carefully to these strings, exactly as do masons.

But a mason builds a vertical wall held together by lime and cement, whereas dykers build a wall sloping inwards as it rises, and ensure its compactness by so laying every stone that they lock and bind each other to the work—and *that is where the skill lies*.

The portion above the 'double' where single stones are used is called the 'single,' but when stones are big enough to extend from face to face all the way up, the dyke can be 'single' throughout, but this is seldom the case.

In building, dykers bring up both faces of the dyke evenly together, they break joint all the time, they strengthen the work by laying each stone with its length inwards, and pack the inside of the double with good hard stones, this 'hearting' being very important. The work is further strengthened by laying across the dyke large flattish stones, stretching from face to face and projecting very slightly on each side. These 'through-bands' should press as evenly as possible on the stones below them, at about 36-in. centres.

At the top of the double they lay the cover-bands ; these also are through-bands, but they touch each other all along.

The cover-band stones fulfil three purposes : they bind the dyke together ; they protect the inside from nearly all the rainwater ; they form a bed for the copestones, often called 'clonks.' Copestones or 'clonks' should be of good shape, 12 to 14 in. high. Skill is wanted to get them to bind and lock together.

Another good form of coping is by using flat stones of good size, on edge, packed closely together, finally locking them together by driving in a wedge-shaped thin stone.

A 5 ft. 3 in. dyke is generally built double to within 14 to 18 in. of the top, depending on the size of stone available for the cope. It should carry, besides the cover-band stones, two rows of through-bands, one at 20 in. and one at 40 in. above the grass. These two rows are 'staggered.' Often one meets with what used to be called 'snecks.' These are portions built single of very big stones. They use up the big stones in the best way, and have the effect of tightening the work and dividing it into panels.

While building up, every stone should have a good bed on the stones beneath it, and the more the man can get the centre of gravity of each stone to pass through the centre of the bedding surface, the better is the work.

'Pinning' must not be used to steady large stones on those beneath by inserting small flat stones or pins. This is very often done, but it violates the principle of making the centre of gravity pass through the bedding surface. For this reason dykers should have enough stones from which to choose. When that is the case, good dykers go ahead fast and "never luik at a stane twice" as the saying is, and need not spend much time in dressing stones with the hammer. This practice of pinning to make a bed has crept in because men have been given gaps to repair without additional stones.

Pinning proper comes when the dyke as such is finished. Then it can be improved in appearance, made rabbit proof, and perhaps very slightly strengthened by driving in small stones into the interstices with firm but gentle taps with the hammer.

The temptation to show a smooth surface, "a weel-skinned" dyke, will result in inferior work in bedding the stones. Take, as an extreme case, a stone shaped like half a big cannon ball. The one flat surface looks grand on the outside, but to hold it there would require propping on the inside in three places, and very soon these 'pins' would fall out to the detriment of the dyke.

Owing to shortage of good material, the dyker against his own judgment may have to fill up the hearting with small stuff that washes out, and in the course of a few years the dyke becomes hollow.

Naturally and unavoidably, unless we have watched the dyke being built, we judge it from its outside appearance, for that is all we can see. The uninitiated, though interested, visitor and countryman, that is to say about 99·98 per cent of people who see the thing, are bound to judge it by its outside. It may have a

smooth countenance, but its heart *may* be full of corruption. In fact, as says Samuel Smith of Borgue, who wrote the Agricultural Survey of Galloway in 1813, "there are few operations connected with husbandry where so much depends on the skill and fidelity



Fig. 1.—A *strang stane* dyke of granite, 5 ft. 6 in., built 1867.
No "sleekie skin" here. A good example of breaking joint.



Fig. 2.—A *strang stane* dyke showing two rows of through bands, built about 1778. It is 6 ft. 3 in. high.

of the workman than in the building of dykes. But there are few where the want of these will more easily escape detection."

A bit of a pessimist the Reverend Samuel, and no doubt among the large number of dykers of those days some black sheep were to be found, but if we give men good material they will turn out good work.

Quite recently, owing to troop manœuvres, damage has been inflicted on fences of all kinds. It is important that this should be put right now. If lack of skilled labour prevents a gap in a dyke being rebuilt, at all events cheeks should be put into the ragged edges of the gap to prevent falling in. The material is there, a dyker and his hammer are all that is needed.

At dangerous bends on roads and on the convex side where view is restricted, open fences of wire or iron railings have very properly been put up. But in several cases these railings appear on both sides where the road bends. On the convex side they are wanted, but on the concave side they are an unnecessary expense as against a dyke or a hedge. A moment's thought tells us that it is into the concave side that the car crashes.

Between Dumfries and Gatehouse of Fleet one passes several of these erections, about six years old, and at least three have portions crumpled where vehicles have crashed into them. The railings for yards have been distorted, and some day will have to be pulled out and straightened in the blacksmith's shop. Had the crash been through a dyke, a good dyker could have put the dyke back in a morning.

As stated before, dykes are being put along newly aligned roads by county councils, using stone out of the cuttings made. These two methods, the sensible one of employing local craftsmen and local materials for building dykes (and hedges, in many parts of England), and the erection of unnecessary railings are so at variance that we can only think that it is the Ministry of Transport that is at fault, for they have taken over many main roads.

There is another glaring instance in Wigtownshire east of Glenluce. Here a lot of bends have been straightened out, but instead of using the stones thus made available and the good stones of the original dykes, a huge 6-ft. high railing has been put up on both sides of the road for a quarter of a mile. The view never was restricted, and this railing certainly was put up against the protests of the County Council. It must have cost the taxpayer—not the ratepayer—ten shillings a yard at least, and it should be painted every year with that added cost. Soon it, too, will show the scars of traffic accidents, which it is ill-adapted to withstand. The pity of it is that it does not keep out lambs at the bottom.

Black-faced sheep will jump dykes of less than 5 ft. 3 in. if they have been brought up on ground where they have been allowed to learn to jump gaps. But a 4-ft. dyke can be made proof against them by two strands of wire stretched along 6½-ft. posts. These posts should lean on alternate sides of the dyke, and can be as much as 12 ft. apart. As the posts need only just go into the soil they can be of light peeled coppice poles, which will last for seven years, and for twenty if hot-creosoted. It would be better to raise the dyke to 5 ft. 3 in., but that might be too much to undertake. But before the wiring is started the dyke must be topped up level with a good cope. This fence is unsightly, but good enough in unfrequented places.



Fig 3 — *A strang stane dyke showing an unusually low double, built about 1788 4 ft 9 in high*

It must have been very well hearted Building price 2/ a rood

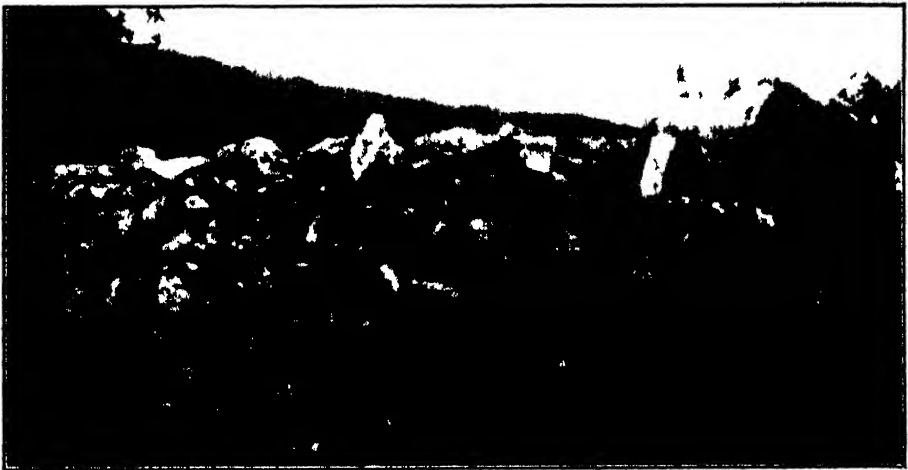


Fig 4.—*A rickl'd rood.*

Note —The two dykes (Figs 2 and 3) are gone over by one man for two days each year, 1200 yards in all.

Another form of dyke is a combination of dyke and hedge. It is called a 'sunk fence' and sometimes a 'Galloway hedge.' It acts best on sloping ground. The first appeared on St Mary's Isle estate in about 1730, and a number were established there later by Lord Selkirk, and also in the Gelston district. A broad shallow trench is dug, the uphill side of which is made vertical. Against this vertical face the dyke is built, the earth having been thrown uphill. When the dyke reaches the surface of the unstirred earth, the thorn plants are laid across the dyke, long ones with their roots bedded in the earth thrown up. A very little earth is laid on the stones to prevent injury to the plants. The dyke is then carried up above the stems of the plants to about 4 ft. 6 in. and finished with a locked top. The thorns in growing turn themselves up the down-hill face of the dyke and eventually overtop it. Sometimes the thorns are planted in the soil above without going through the dyke.

This makes a capital fence against all sorts of stock. It has all the virtues of a hedge, with the additional ones of being practically impervious below, and the fact that weeding is not required. But it takes six years to become effective, and, of course, requires annual attention throughout its length. They do not seem to be made now, perhaps for this reason, but they are very valuable fences and should be strictly maintained by those lucky enough to have them.

There is another form of dyke of which there are plenty in Scotland, but of which the virtues have largely been forgotten. We hear of Galloway dykes, presumably because Galloway first specialised in dyking, and the term now is applied loosely to any form of dry stone dyke. But the authors of the 'Survey of Agriculture in Scotland' write very differently. Those writers for the Counties of Argyll, Inverness, Stirling, Dumfries, Roxburgh, Hebrides, and Galloway, who wrote between 1798 and 1814, use the term in a special sense. By them the words are written with a hyphen and sometimes with a small g—thus, "*galloway-dyke*." This "*galloway-dyke*" was built in those counties especially against black-faced sheep, and, owing to one very special peculiarity, they state that sheep just refuse to try to jump it.

What they say is supported by 'Sinclair's General Report,' 1814, and much later still by Professor John Scott in his 'Text-book of Farm Engineering,' 1885. The dyke is built to 5 ft. 3 in. high, 32 in. thick at the base. The cover-bands are put on at about 40 in. above the grass, the usual hearting and through-bands being carried out. Now here comes the peculiarity. The next 22 in. consist of large rough stones, laid and interlocking and narrowing towards the level top, but with wide interstices between them and the *light showing through*. No pinning is done in this portion.

All these authors state unequivocally that cattle and sheep will not attempt such an obstacle. The light showing through the stones seems to deter all stock. Now this sounds odd, and it is certainly not generally known. Dykers and shepherds when questioned find it strange, but I know of two gentlemen with

extensive sheep farms who are convinced about the matter. The author of the 'Argyllshire Report' says: "The upper courses of galloway-dykes ought to be made as narrow and open as possible to afford the least footing to sheep and to let them see through. And if the first course of single stones should project a little over the double wall so much the better. Of all dykes this is the most formidable to sheep. A double wall of twice the height will not turn them with equal certainty. Its tottering appearance and seeing light through the stones deter them from any attempt to scale it, together with a want of footing on top. These walls may be made of the coarsest stone, and when they are properly made with the centre of gravity resting on the stones below they stand better than double walls."

The 'Inverness-shire Survey' says: "These walls have such a tottering and alarming appearance that all kinds of cattle are terrified to attempt them, and as an additional recommendation they require fewer stones, are more expeditiously built, and last as long as double stone walls without lime."

The 'Stirling Report' says (1812): "Of the various sorts of fences now employed the rudest and the simplest in its construction is the galloway-dyke. It is formed of large ill-shaped stones strongly wedged together for about two-thirds of its height and then of stones gradually decreasing in size for 18 in. to 24 and more. The interstices between the stones are wide and the light being seen through frightens the cattle, especially the sheep, and deters them from attempting them. They are cheaply erected and cheaply repaired. In the parishes of Fintry, Denny and St Ninians, many miles of such dykes exist."

The 'Dumfriesshire Survey' (1812) says: "The Galloway-dyke is incomparably the best, but a great deal of good and durable stone is necessary. It is never less than 5 ft. high, often 5 ft. 3 in., being 32 in. broad at the grass, cross laid with stones called through-bands, one for every 3 ft. of length, and finished above with a series of long stones showing the light through the interstices and yet firmly holding by one another."

The 'Roxburgh Survey' (1798) says that dykes were often topped with turf, and that this is best done with the turfs placed on edge and 'condensed' together with a spade. "A few large stones placed loosely on the top above a kind of projecting cope, with apertures to admit light, deter both cattle and sheep from attempting to break through." A footnote adds, "Here called galloway-dykes, walls of that nature being common in Galloway."

The 'Hebrides Survey' says: "The Galloway-Dyke, a species of enclosure commenced in 1720 in that Southern District of Scotland and now well known and esteemed over this kingdom, is the most advisable for the Western Isles. From 5 ft. to 5 ft. 10 in. high, 3 ft. thick at the bottom and gradually diminishing in breadth till within 18 in. of the top." He goes on to say that the stones near the top "afford daylight in the interstices of the stones, and this terrifies sheep and cattle from any attempt to jump them."

'Sinclair's General Report' (1814) states: "Though at first sight the open portion of this fence may appear slight, long experience has established its efficiency in deterring animals from climbing over, to a greater degree perhaps than a more solid wall of greater height. The solid part at bottom, at least 32 in. thick, tapering to 18 in. and 44 in. above the grass, the open work going 22 in. higher."

Professor John Scott (1885) quotes from Sinclair.

These bygone authors vary somewhat over building, but there is a most decided consensus of opinion about the way these dykes "deter and terrify" sheep. One often sees a dyke on a skyline, the stones making an almost lace-like pattern, especially with a westering sun behind them. Perhaps they do exhibit a tottering appearance.

It seems that many miles of galloway-dykes, to give them their earlier hyphen, were built and that the real point of the open work has been very largely forgotten. Perhaps well-meaning people went so far as to pin up the interstices, thereby frustrating the early intention. It is easy to see how such things can be forgotten. Outgoing tenants forget to mention the matter to incoming ones—shepherds change and say nothing. A laird dies with his heir in India. A new factor takes over after an interregnum.

Some farmers in the High Peak district of Derbyshire like to see light showing through the stones. Other people think that the dyke stands the wind better, and also that snow-drifts can come through the wall and thus ease the pressure.

Somewhat analogous is that form of gateway without a gate, where a ditch spans the roadway between the old gateposts, the ditch being covered by a strong iron grid which carries motor traffic. It is not the want of foothold that turns stock, but the rising current of air between the bars.

Be all that as it may, there is no doubt that our forebears built these "tottering terrifying dykes" to deter sheep on the hills.

COSTS.

The usual custom is to work by the job. A good dyker works fast and thereby makes the better living, and he should get the chance of excelling in this way. If he is a reliable and a local man he will do good work. A team of dykers may want some oversight.

Working by the hour probably results in better work on the whole, though it tends to rather a lower speed. An old estimate gives in 1814: 2s. a rood quarrying, 2s. 6d. a rood carting, 2s. a rood building.

Wages at this time, March 1944, are difficult to assess, but dykers should get more per hour than the agricultural labourer. They can do the latter's work, and they have their own special skill.

Two skilled dykers, with stones put to them, can build two roods (18 ft. to a rood) of 4 ft. 9 in. dyke in a nine-hour day. So the two men would build sixty-six yards in a fifty-hour week.

That is fast work by men who "never luik at a stane twice," and, in practice, less will be done if the men have to divert water, dig out roots, or have much dressing of stone to do with the hammer. In addition, for repair work, a cartload per rood of good stones will give the men a choice and speed up the work.

Carting, naturally, will be done, if possible, downhill from some suitable bing or outcrop. On the hill a rough sled answers well.

A rood of length is a Scottish measure, and in most counties is 18 ft. In a few it is 19 ft., and in one or two 20 ft. In one of the old surveys dyking was done by the ell of 37 $\frac{1}{2}$ in. and a man did "a rood of 6 ells a day of 5 foot dyke." In the Hebrides and Argyllshire the measure was the 'fall' of 18 ft. A rood, therefore, is not a rod, nor is it a pole nor a perch.

STONE.

The stones used should be of good size and not water-worn from burns. Most of the stone in Scotland is hard and suitable, whinstone, granite, and, in some districts, porphyry. In Clydesdale the practice was to quarry and cart the stone in the autumn, to lie weathering on the site through winter, and in spring the good stone could be easily picked out. That practice is unnecessary in most districts. Of course, when the work is done, the surplus stone should be carted away at once. The farm roads will want it, and the road surveyor will even buy it.

Earlier in this article it was stated that no farming paper ever mentions dykes or hedges, nor for that matter does the Ministry of Agriculture. But fences do get mentioned in farming papers—in the advertisement columns. Not so much just now, for metal is scarce and rationed, but pre-war journals were full of advertisements about wire fences of every kind—thereby increasing their cost.

Dykes and hedges do not advertise, their merits are patent if we would only look, and till now they have held their own. May that continue, and let us avoid bringing the distant uninterested mechanic into the sphere of the local interested craftsman.

One thing dyking has, it has a poet, and that is more than can be said of the silo or the combine harvester, and we may well close this article with some verses from John MacTaggart's "Elegy on Davie the Dyker" in his Galloway 'Encyclopædia.' Davie must have been a character, for there are no less than eighteen verses to his memory. The spelling is unusual, but the lines are reproduced exactly as printed, and we will not insult Scottish farmers by adding a glossary.

Four of these verses are enough; they form a very epitome of the art, and a study of them tells us just how to "bed a stane and big a dyke."

ELEGY ON DAVIE THE DYKER, BY JOHN MACTAGGART.

And was there ever ere his like,
 At bigging o' a strang *stanedyke*,
 He was na fractious, dip na fyke,
 For meikle doon ;
 He sought for throughban's that wad *rike*,
 And capes wad croon.

His dykes had ne'er the sleek'd skin,
 Ne'er fair without and false within,
 He didna *batter, line* and *pin*,
 To please the e'e ;
 There no'er was heard a clanking din,
 Whar biggit he.

A rickled rood ne'er left his han',
 His dykes for centries will stan'
 A *slap* wi' clutters niver fa'en,
 In ane o'em pet ;
 May they the name o' he, puir man,
 For ages got.

Owre moor and dale for mony a year,
 May Davie's famous dykes appear,
 Ne'er bilged out wi' wather-wear,
 But just the same
 As when, poor cheel, he left them there—
 To bear his name.

INSECT AND OTHER PESTS OF 1943.

By A. E. CAMERON, M.A., D.Sc., F.R.S.E.,
Consulting Zoologist to the Society.

INTRODUCTION.

THE control of insect pests of crops would be greatly facilitated if the entomologist could devise a system of accurate forecasting of outbreaks. As matters are, farmers and market gardeners may be faced with destructive insect infestations at short notice, and considerable damage may be done to valuable food and other crops before effective measures of control can be undertaken. Regional fluctuations in the density of populations of insect pests are primarily determined by weather, and the reasons for an insect outbreak are to be sought not in the type of weather which actually prevails at the time of the outbreak, although this may have a modifying effect, but in the weather conditions antecedent to its occurrence. For instance, infestations of the common Leather-jacket or Grub of the oat crop usually follow a wet autumn, which favours the development of its early larval stages in grassland, where the eggs are laid by the parent fly. Dry conditions in the autumn, on the other hand, serve to keep the pest in check since exposure to prolonged drought destroys such numbers of the young grubs that the subsequent oat crop is not or little molested. Because of the variability of their reactions to one or other of the complex of factors which are summed up in the term weather, among which temperature and humidity are all important, conditions which favour some insects may prove entirely unsuitable to others. Hence there is a marked lack of uniformity in the periodicity of outbreaks of different pests. Winter is especially a testing time for hibernating insects, not so much because of low prevailing temperatures as of exposure to the baneful effects of alternate thawing and freezing. Mass outbreaks in our northern latitudes are therefore an index of the insect's power of resistance to the stringencies of weather experienced at an earlier stage of its career, and, generally speaking, a mild winter encourages the development of outbreaks during the following spring and summer. Until such time as we have acquired more detailed knowledge of the relationship of weather to insect survival, forecasting of outbreaks can be merely a matter of guesswork. The problem is even more complicated than would appear at first sight, since it involves the question not only of weather, but that of the habits of parasites and predators which subsist on insect pests and are themselves subject to the controlling influences of weather.

During 1943 the outstanding Scottish entomological events were, first, a recurrence of the greenfly infestation in the Lothians, repeating those of 1935 and 1939; second, a resurgence of the Cabbage White Butterfly, of which a previous outbreak was reported in 1940; and third, the reappearance of the Heather Beetle on Scottish moorlands, the previous outbreak of which subsided in 1938. Since 1937, the year of the last outbreak of the Antler Moth on Scottish hill farms, this insect has been kept under review at selected suitable sites. Until 1942 the caterpillar population of the moth remained at an extremely low level, and the slight increase noted on hill pastures in the early summer of 1943 did not develop into an outbreak; later in the summer, scattered moths were observed in upland districts, and may foreshadow an impending outbreak.

For the first time since the introduction of the war-time ploughing-up policy of grassland, large-scale losses of crops were observed on farms in Roxburghshire due to wireworm attack aggravated by rooks quartering infested fields and pulling up plants in their search for wireworms. Crops that had been re-sown once or even twice fared no better than did those first sown, and farmers were faced with a serious shortage of turnips for the winter feeding of stock.

The acreage under flax has been greatly extended during the war, and, on the whole, this crop has been little subject to insect attack except for Wireworms and Leather-jackets. The latter trim the shoots of the seedlings just above ground, and although the plant may recover by the production of adventitious buds, its growth is seriously retarded, resulting in a reduction of yield. From Fife there came the report of a puzzling case of destruction to flax which, investigation showed, was attributable neither to Leather-jackets nor other soil-infesting insects, but to flocks of greenfinches nesting in near-by hedgerows.

In recent years there has been an increase of Frit Fly in the oat crop and of Gout Fly in barley, which may be partly traceable to the war-time practice of taking one white crop after another. In the majority of cases examined the damage done by these pests has not been extensive, but in 1943 several instances of fritted oats characterised by 'blindness' of florets were noted.

In the autumn of 1943 a Fifeshire farmer reported that his haystacks were teeming with caterpillars discovered by farm workers engaged in carting hay. The caterpillar was identified as that of the Pale Mottled Willow, a species common in Britain, and previously recorded in the 'Transactions' of the Society by MacDougall in 1932.

Among forest pests the only one about which inquiry was made was the Pine Sawfly, and this came not from a forester but from the owner of a garden who found the caterpillar in clusters stripping the foliage of a young Scots Pine not far distant from an estate plantation which, however, appeared to be free from infestation.

Late in the summer our attention was drawn to a peculiar

condition in a raspberry plantation in Perthshire. For several years growers had noted a stunting of the canes, for which no satisfactory explanation could be found. A careful examination of the buds of affected canes resulted in the discovery of mass infestations of the mite *Eriophyes gracilis*, related to the Big Bud Mite of black currants and gooseberries. As to whether this mite is the cause of the stunting can only be decided by further investigation.

Considerable interest has recently been shown by Scottish dairy farmers in the activities of the Stable Fly. This insect makes itself quite at home in the byres, and by its persistent attacks on the cattle at milking time does not facilitate the task of the milkers.

Sarcoptic mange of cattle is not considered to be prevalent in Scotland, but it may be more frequent than is imagined. In November a case of mange was noted in a bull in the Western Isles, and an examination of skin scrapings showed that the mite responsible for the condition was *Sarcoptes scabiei*, var. *bovis*.

Mention must also be made of certain household insects, among which inquiries about the Furniture Beetle, the Fire-Brat, and the Red Mite, *Bryobia pratiosa*, are continually recurring. Strictly speaking, the mite is not a true household pest in that it does not damage household effects, but causes concern to housewives by its mass invasion of houses through open windows and doors from garden vegetation.

GREENFLY (*Myzus persicae*), AND VIRUS YELLOWS.

Recent previous outbreaks of *M. persicae*, the greenfly of cruciferous and potato crops, were discussed in the 'Transactions' of the Society in 1936 and 1940, when, as usually happens, it was associated on crucifers with the Mealy Cabbage Aphid, *Brevicoryne brassicae*. In 1943 the intensity of the greenfly infestation in the Lothians was even greater and more widespread than on the two previous occasions cited, extending along the coastal area from Musselburgh to Dunbar, and inland to farms adjoining the Pentland Hills. The attack was first noticed in July after a warm dry period in June, and in the space of four weeks Brassica and potato crops went down under the sheer weight of numbers of the pest. As a result there was a substantial reduction in the yield of infested crops, and some fields of early turnips became a total loss. In its migratory flight the Greenfly spread indiscriminately to a wide variety of crops, certain of which, such as beets, received but a temporary check. Persistent and heavy rains in August practically eliminated the infestation, and affected crops were enabled to make a partial recovery during the short season of growth that was left.

Coincident with the greenfly infestation there developed in adjacent sugar-beet and mangold crops the disease called Virus Yellows, not previously recorded in Scotland. Its occurrence was first observed in July by Mr R. Heddle, Advisory Botanist, East

of Scotland College of Agriculture, and his diagnosis was later confirmed by Dr R. Hull, Midland Agricultural College, Sutton Bonington. A survey demonstrated that the infection of Virus Yellows was heaviest in Lothian crops situated within the area of greenfly infestation, and that here anything from 50 to 100 per cent of the crop was affected. By way of comparison, the survey was extended to crops in non-infested greenfly districts in Berwickshire, Roxburgh, West Lothian and Fife, where the infection was shown to be either absent or present only in small patches distributed thinly through individual fields.

So far as the dissemination of Virus Yellows is concerned, reference to literature¹ shows that the infective agent is transmissible both by the Greenfly, *M. persicae*, and by the Black Aphis, *Aphis fabae*, and since the latter proved to be very rare on sugar-beets and mangolds in Scotland in 1943, suspicion naturally attaches to the Greenfly as the responsible carrier. Acceptance of this argument does not, however, serve to explain the late-season spread of the virus in fields in which the Greenfly is absent.

As a corollary to the question of spread there arises the problem of survival of the virus during the winter, especially as it is known to be non-seed-borne. In those parts of England where Virus Yellows is common, it has been suggested that the beet-seed crop may serve as a winter reservoir, where aphids may initially acquire infection and pass it on to field crops of sugar-beets and mangolds. In Scotland, however, where beet-seed crops are not grown, one must seek further for the source of infection. Neither do alternative hosts, of which several are known, answer requirements, since the most common and widespread are annual weeds. One must, therefore, fall back on the possibility of the persistence of the virus during winter in ground-keeper beets and stored mangolds, and farmers whose crops have been infected one season would be well advised to destroy ground-keeper plants, which may appear in the fields the following spring.

Overwintering of Greenfly.—Unlike the Mealy Cabbage Aphis (*Brevicoryne brassicae*), which passes the winter in the egg stage on old stumps of cabbage, Brussels sprouts, or on cruciferous weeds, the Greenfly spends the winter chiefly as wingless females on winter Brassicæ. In the South-East of Scotland its mode and sites of hibernation are similar to those reported by Davies² and Jacob³ in North Wales, and by Staniland⁴ in Devon and Cornwall. On 11th January 1944 observations on the overwintering population of *Myzus persicae* were made in the South-East of Scotland, following upon two nights of hard frost when temperatures round 25° F. were recorded. Large numbers of mature wingless females and

¹ Watson, M. A. (1942). "Sugar Beet Virus Yellows." *Ann. App. Biol.*, Vol. XXIX., No. 4, pp. 358-365.

² Davies, W. M. (1931). "Studies on Aphides infesting the Potato Crop.—II. Aphis Survey: Its bearing upon the selection of districts for seed potato production." *Ann. App. Biol.*, Vol. XXI., No. 2, pp. 283-299.

³ Jacob, F. H. (1941). "The Overwintering of *Myzus persicae* on Brassicæ in North Wales." *Ann. App. Biol.*, Vol. XXVII., No. 2, pp. 119-124.

⁴ Staniland, L. N. (1943). "A Survey of Potato Aphides in the South-Western Agricultural Advisory Province." *Ann. App. Biol.*, Vol. XXX., No. 1, pp. 38-42.

young immature forms of all stages were found immobilised by cold on the under side of the basal leaves of savoy cabbages and the coarser stem-leaves of Brussels sprouts. They were less frequent on young plants of early spring cabbage, and not present on seedling cabbage plants. Dispersed here and there among the wingless individuals there were a few winged forms and some with developing wing-buds. The occurrence of numerous, minute, first-stage forms suggested that during the mild weather preceding the frost, reproduction had been proceeding. In an open winter, therefore, a Greenfly population so far from remaining static may even contrive to increase.

Control.—The question of Greenfly control was discussed in the 'Transactions' of last year (p. 80), and attention was drawn to an apparatus used by sugar-beet and other growers in England to counter Black Aphis and Greenfly. Unfortunately this apparatus has not yet been made available to Scottish farmers, many of whom, through lack of necessary dusting and spraying equipment, are not in a position to cope successfully with severe aphid infestations.

The principle upon which the machine mentioned above operates is based on fumigation of infested crops and the retention of the fumigant among the foliage for such time as will ensure destruction of aphids. Judging from the results claimed for its use against Black Aphis on sugar-beet, there is every reason to suppose that it would be equally effective against Greenfly on all low-growing crops. The insecticides employed are either a mixture of nicotine gas and nicotine vapour, or simply nicotine dust. At the height of the infestation in July 1943 one Scottish grower attempted to stem a Greenfly attack on his crops by dusting them with a 3 per cent nicotine dust, using an ordinary dusting machine. The day on which the operation was carried out was somewhat breezy, and much of the dust was dispersed into the air and carried away from the plants which it was intended to treat.

From the fact that the basal leaves of Savoy cabbages seem to present more favourable conditions for the overwintering of the Greenfly than other winter Brassicæ, growers might assist materially in its control by gathering and composting or burying these leaves when the crop is being cut for market in winter.

WIREWORMS.

In the 'Transactions' of 1940, the life-history, habits, and control of wireworms were discussed in the light of the information then available. As a result of the investigations made by the Advisory Entomological Service in England, which commenced in 1939 and are still being continued, our knowledge of the wireworm problem has been considerably enlarged, and the chances of crop success or failure within certain limits of wireworm infestation are now more plainly defined.

For a clear understanding of the relationship of the wireworm problem to the cropping of arable land, the facts of the life-history

of wireworms should be kept prominently in mind, and although they may be generally known to farmers and others, their repetition here will not be wasted.

Life-history.—Wireworms, as is well known, are the larvæ of Click Beetles or Skipjacks, of which there are several kinds, but, in Britain, *Agriotes obscurus* is the one of greatest agricultural importance, followed by *Athous hæmorrhoidalis*. The adult beetle of the former is dark brown and about $\frac{3}{8}$ in. long, whereas the latter, which is less convex and more parallel-sided, is reddish-brown and measures about $\frac{1}{2}$ in. long. From March to June *A. obscurus* is found on the surface of the soil tucked away under stones, among tufts of grass, or in crevices. It appears to shun the light and is probably more active by night, when the humidity of the air is higher than it is by day, and this seems to explain, as Cohen¹ suggests, its more frequent occurrence in grassland than in arable soil where the humidity is below optimum. Although it is said to take wing under conditions of high humidity in the evening, its flight has only been rarely observed.

The egg-laying season extends from April to June, and the eggs are deposited in small groups in grassland soil close to the surface. Each female lays about one hundred eggs, which are almost spherical, glistening white, and about $\frac{1}{16}$ in. in diameter. Hatching occurs in five to six weeks, and minute first-stage larvæ, about $\frac{1}{16}$ in. in length, first found in the soil in June and July, enter upon an existence which continues for four years. During this protracted period of development the wireworm moults its skin eight times and attains a final length of about 1 in. The larva of *Agriotes* is characterised by its slender cylindrical form, its yellowish colour, smooth polished tough skin, and cone-shaped hind end. In wireworms other than *Agriotes* occurring in the soil the hind end is compressed and bears two short, broad prongs.

The wireworm when ready to pupate makes for itself a small cavity in the soil, three to four inches beneath the surface, and here, in September of the fourth year, it moults its skin for the last time and transforms to a soft white pupa. In this inactive condition it exists for only three to four weeks, when it again transforms to the adult beetle, which continues to occupy the underground pupal cell throughout the winter until March or April, when it makes its way to the surface. Altogether, having regard to both its subterranean and surface existence, the beetle has a longevity of almost a year.

From the foregoing account it will be readily understood that a grassland wireworm population consists of a mixture of individuals of different ages varying from less than one up to four years. Each year a certain uncalculated percentage of the population passes from the soil as adults, and compensation for this loss is found in the annual addition of young wireworms hatching from eggs laid in the soil by the adult female beetle. Everything else being equal, the fertility rate of the females is such as might induce a

¹ Cohen, M. (1942). "Observations on the Biology of *Agriotes obscurus*." Ann. App. Biol., Vol. XXIX., No. 2, pp. 181-196.

steady upward trend in the level of the population each year, but facts demonstrate that it does not fluctuate much from year to year, and this may be attributed to causes as yet unmeasured, such as disease, predators and parasites, of which the last do not appear to be common.

Wireworms and Grassland.—It is a matter of common knowledge that wireworms are primarily inhabitants of grassland, where they feed on the roots of its varied plant components. Even in cases of intense infestation it is doubtful whether, despite opinions to the contrary, pasture deterioration can be justly attributed to the concentration of their feeding activities on the finer plant elements. Bare or thin patches, for which wireworms are sometimes blamed, may be due to local soil deficiencies and bad farming. So far as the eye can judge, permanent pastures maintain an evenness of quality year after year which wireworms do not appear greatly to disturb, and any effects which they exercise must of necessity be gradual, since they are not markedly selective in their feeding.

Distribution of Wireworms in Pastures.—The distribution of wireworms in different pastures is by no means uniform, and even in the same pasture there may be considerable variation in the degree of infestation in one place as compared with another. So far as different pastures are concerned, the wireworm population may vary from nothing in one to more than a million per acre in another, and in individual fields may be concentrated in patches and practically absent in the intervening spaces. For this lack of uniformity in distribution no adequate explanation has yet been offered, and it does not appear to be associated with the age of the pasture, its soil type, vegetative composition, or exposure. So far as the individual pasture or grassland is concerned, patchiness of infestation may be the result of the localisation of the sites of oviposition of the beetles, which would tend to choose for the purpose parts that were optimum for humidity and temperature. It is conceivable that wireworms on hatching would continue to remain close to the place of their hatching, provided the conditions were likewise optimum for their survival. On the other hand, wireworms are expert in burrowing, and during the four-year period of their soil existence there would appear to be nothing to inhibit their dispersal except the comparative imperviousness of the soil itself. As to the extent of their wandering, the very seclusion and obscurity with which they are protected by their subterranean environment precludes investigation of their activities by direct observation. In arable land, however, where the soil is less compact than that of grassland and food-plants less concentrated, search for food becomes an important incentive to wireworm migration, and is traceable by the progressive, serial damage they do to crop plants grown in rows, and by their assembling at attractive baits, such as germinating wheat seed.

Cases of marked localisation of wireworms in pastures are occasionally encountered, and two occurred during the course of a wireworm survey of old pastures in South-East Scotland that were later to be ploughed up for cropping. The two pastures

concerned were alike in that they were brae-set with a southerly exposure and the ground more or less level above and below the brae. In both, the wireworm population was chiefly concentrated on the upper part of the brae-face and adjacent level ground, and the only reasonable explanation that could be advanced for this concentration was that the conditions for egg-laying were perhaps more suitable there than over the rest of the field. Soil and vegetation were uniform in the infested and non-infested parts, but drainage may have been better at the top of the brae-face than elsewhere. In one of the two fields where the population exceeded a density of one million per acre, the curious fact emerged that some twenty-odd years ago, when the field was last ploughed, a crop failure due to wireworm attack occurred in that part where the greatest concentration of wireworms still existed to-day. The owner of the other field had had a somewhat similar experience, but with a lesser infestation damage to the crop was of smaller dimensions.

Wireworm Surveys.—Beginning in 1940 a survey of the wireworm populations of pastures and other grasslands, which by reason of age—seven years or more—had qualified for the Government war-time ploughing-up subsidy, was undertaken on farms in East and South-East Scotland. The plan followed in making the survey was identical to that adopted by the Advisory Entomological Service in England under the Ministry of Agriculture. Whilst the English survey covered the whole of England and Wales, the Scottish one was confined to a district extending from just north of the Firth of Forth to the Borders, within the area served by the East of Scotland College of Agriculture. The farms on which the survey was made were selected by the County Organisers acting in their capacity as officers of Agricultural Executive Committees, and were distributed over the counties of Fife, Kinross, West Lothian, Midlothian, East Lothian, Peebles, and Roxburgh. The assistance of the County Organisers with their special knowledge of local agricultural conditions greatly facilitated the work of the survey. With the resources available it was possible to examine not more than seventy fields, and, although the number could have been advantageously increased in order to determine more accurately the trend of wireworm infestations in the individual counties, the results of the Scottish were found to agree fairly closely with those of the English survey.

Purpose of Surveys.—So long as wireworms are confined to their primary habitat—grassland—farmers are little concerned about their activities. When, however, grassland is converted to arable, the relation of wireworms to cultivated crops presents a problem of quite another character. Their destructiveness, which has heretofore been negligible, can now be measured in terms of crop loss or failure, and early in the season their activities can be visibly appreciated from day to day in the damage they do to young cereal and root crops, and, later in the season, to the tubers of growing potatoes. It thus becomes important to establish a standard by which chances of crop losses may be estimated, and, thereby, select a crop which will most likely withstand attack by wireworms of

a known degree of infestation. One must, therefore, determine for any particular kind of crop, the threshold of infestation below which damage may be negligible or insignificant, and above which serious crop losses may result. Hence it is evident that correlation of the severity of crop damage with degree of wireworm infestation must be the basis of prediction of crop success or failure. At the same time the farmer must realise that the practice of good cultivation, together with high soil fertility, will often materially assist the achievement of successful cropping despite intense wireworm infestation.

From this it will be seen that the assessment of wireworm populations is all-important, and, unfortunately, there is no satisfactory method of reckoning them other than by the tedious one of counting. Counts of wireworms on arable ground where they are less randomly distributed than in grassland are likely to be fallacious and give a false index of the total population concerned, and so they were neglected in the Scottish survey.

Mode of Computing Wireworm Populations.—For the sake of uniformity the procedure of computing wireworm populations in Scotland was similar to that adopted in England and described by Yates and Finney.¹ Fields of twenty acres or less were divided into twenty roughly equal areas, and a sample of soil taken at random from each area. In fields larger than twenty acres, one sample per each additional acre was taken. The sampling tool was like that used for making golf-green holes, extracting a core of soil of 4 in. diameter and 8 in. deep. The top surface area of such a sample is roughly equivalent to 1/500,000 acre, and so the transformation of the average number of wireworms per sample to the average number or mean population per acre becomes a matter of simple calculation. Thus, one wireworm per twenty samples examined is equivalent to 25,000 per acre, and two per the same number of samples would double this figure, and so on. This is not to say that the method is devoid of errors affecting the calculations, but Yates and Finney (*loc. cit.*) have shown that for all practical purposes it is sufficiently accurate in correlating wireworm populations of different magnitude with the damage they do, as well as forming a basis for the study of wireworm distribution throughout the country and their seasonal variation.

By a more precise method of wireworm extraction involving preliminary washing of the soil samples, followed by flotation of the contained wireworms in a weak solution of magnesium sulphate and completed, after further washing, by their separation in benzene, Salt and Hollick² have shown that wireworm populations are about three times as large as have been formerly supposed. Their higher figures are due to the recovery of the smaller wireworms, less than one-fifth of an inch, which are readily overlooked by the method of hand manipulation of samples employed by Advisory Entomologists engaged in the national survey. Since only the

¹ Yates, F., and Finney, D. J. (1942). "Statistical Problems in Field Sampling for Wireworms." *Ann. App. Biol.*, Vol. XXIX., No. 2, pp. 166-167.

² Salt, G., and Hollick, F. S. J. (1944). "Studies of Wireworm Populations. I. A Census of Wireworms in Pasture." *Ann. App. Biol.*, Vol. XXXI., No. 1, pp. 52-64.

larger wireworms are of immediate economic importance, neglect of the smaller ones does not materially affect the conclusions regarding cropping based on the results obtained by the hand-and-eye method of sample examination.

Results of the Scottish Survey.—From the standpoint of obtaining valuable information on the status of wireworms in reference to agriculture in Scotland, it is a matter of regret that a Scottish wireworm survey embracing the whole country had not been made at the same time and on the same scale as the English survey. A valuable opportunity would appear to have been lost, since it may be a long time before such a large acreage of old grassland all over the country is again converted to arable. As matters are at present, only a small section, East and South-East Scotland, was investigated, and the survey was made merely as part of the general functions of the Advisory Entomological Department of the East of Scotland College of Agriculture. The results obtained from wireworm counts made on seventy farms have been summarised by county as follows:—

County.	Mean Population of Wireworms per acre.
Fife	300,000
Kinross	216,000
Midlothian	176,000
East Lothian	61,000
Peebles	85,000
Roxburgh	321,000

West Lothian is not included in the list; in this county only a single farm was examined, on which an old pasture of poor quality was found to have a mean population of half a million wireworms per acre. On the basis of one examination the figure could not be taken as representative and so was discounted.

Considering the whole district surveyed, the mean wireworm population worked out at 176,000 per acre, which exceeds the level of infestation in the adjacent Northern Advisory Province of England, determined by Yates and Finney (*loc. cit.*) as 140,000 in 1939-40 and 160,000 in 1940-41, figures which are lower than that of South-East Scotland. But a comparison between the northern Province and South-East Scotland cannot strictly be made, since the two western counties of Westmoreland and Cumberland, with low mean populations of 60,000 and 80,000 respectively, are included in the former, whilst the Scottish survey did not include any western counties. At the same time, it will be noted that East Lothian and Peebles returned low mean populations comparable with those of Westmoreland and Cumberland. In 1940-41 the average mean population for the three north-eastern counties of England, Yorkshire, Durham, and Northumberland

is given as 240,000 per acre, which is appreciably greater than the figure of 176,000 for the adjacent south-eastern counties of Scotland. Since these two sets of counties, English and Scottish, may be considered as comparable by reason of their easterly position, then the drop in the mean wireworm population north of the Border would be but a continuation of the progressively falling gradient of wireworm population from the south to the north established in the English survey.

Categories of Wireworm Population.—Since the control of wireworms as pests of field crops cannot be accomplished by direct means, the farmer must perforce accept them as a necessary evil, and by modifications of agricultural practice endeavour to reduce the damage of which wireworms are capable. The recent intensive investigation of the wireworm problem has made two contributions to its solution which are likely to prove of great value to the farmer—namely (1) determination of the levels of wireworm infestation below or above which crop success or failure may be expected; and (2) the comparative susceptibility or immunity to wireworm damage of different kinds of crops following ploughed-up grassland. For all practical purposes the following categories of infestation and the recommendations regarding cropping applicable to each as suggested by Jary¹ and others will serve as a useful guide to the farmer:—

- (1) *Populations less than 300,000 per acre.*—Most crops can be safely grown.
- (2) *301,000-600,000.*—Cereal crops are reasonably safe. Sugar beet and Brassica crops, and potatoes, if lifted early, may be grown.
- (3) *601,000-1,000,000.*—If the conditions of fertility and cultivation be good, many crops can be grown, but the majority are liable to injury except resistant ones like peas, beans, and flax. The position as regards cereals is likely to be precarious, and winter wheat, unless sown early, may be badly thinned. Jary (*loc. cit.*) is of the opinion that the yield of spring oats is reduced by 1 cwt. of grain per acre for each additional 100,000 wireworms per acre. Experience has shown that barley is safer than other cereals, and rye may be grown on some very light soils. Whilst silage crops are safe on the whole, their cereal constituents may be seriously damaged.
- (4) *1,000,000 and over.*—At this range only resistant crops like flax, peas, and beans have a reasonable chance of success.

In the *second year after ploughing* the levels of infestation at which crops are liable to damage is lower than in the first year, and Jary makes the following recommendations to farmers:—

- (1) *Populations up to 200,000.*—Cereals, sugar beet, and potatoes may be grown.

¹ Jary, S. G. (1942). "Wireworms and Crop Production." *Ann. App. Biol.*, Vol. XXIX., No. 2, pp. 150-155.

- (2) 200,000-600,000.—At the higher levels cereal crops are not considered safe. Brassica and silage crops may be grown, but whatever crop is selected due regard must be had to fertility and cultivation. Sugar beet and potatoes should not be grown.
- (3) 600,000 and over.—Only resistant crops, peas, beans, and flax should be considered. Cereals are not safe unless they get the best treatment.

Viewed in the light of actual practice, this information will be of the utmost value to the farmer. Should he entertain doubts regarding the advisability of transforming a pasture to arable, he can have his doubts relieved by having the field tested for the level of its wireworm infestation by the Advisory Entomologist of the local College of Agriculture, and follow the recommendations for cropping accordingly. At the same time he must not fail to appreciate that careful cultivation materially helps to reduce an infestation by exposing wireworms to insectivorous birds and by destroying their delicate pupæ in the early autumn.

Results of the Scottish Survey.—In the South-East of Scotland wireworm populations in excess of 600,000 proved to be rare, and the majority of pastures examined ran to less than 300,000, which is evident from the following percentages based on actual sampling counts made in the course of the survey :—

PERCENTAGES OF FIELDS CLASSIFIED ACCORDING TO THEIR MEAN POPULATIONS PER ACRE OR INFESTATION LEVELS.

	Infestation Levels.			
	Up to 300,000.	301,000 to 600,000.	601,000 to 1,000,000.	1,000,000 and over.
	Per cent.	Per cent.	Per cent.	Per cent.
Pasture and Grassland Fields	81	14·5	3	1·5

Actually, 70 per cent of the fields surveyed had a mean population of less than 300,000 per acre and 47·5 per cent less than 100,000. On the face of it, these figures would appear to support the view that the wireworm problem north of the Border is not of supreme importance, but in this regard there are two important reservations that cannot be neglected—namely (1) that the Scottish survey considered only a small part of the country; and (2) that the significance of the wireworm problem is not a matter of county or district averages and percentages, but a local question of the degree of infestation of each particular field and farm.

Of the counties surveyed, pastures in Fife and Roxburgh consistently gave the highest counts, and the largest number of low counts came from East Lothian and Peebles. The reasons for the marked variability of the counts is obscure, and is apparently

quite independent of the altitude of the pastures, their exposure, soil-type, age, and quality.

Crop losses due to wireworms were of more frequent occurrence in Roxburgh than in the other counties, and here, as elsewhere, the damage was very often aggravated by large flocks of rooks. On one farm a crop of turnips was first destroyed by the combined operations of wireworm and rook, and a crop of swedes and a crop of rape which followed in that order suffered each a similar fate. Even as late as September the rooks were still busily engaged pulling up the rape plants in the drills in their eager search for wireworms. There is much that could be said for the rook as an enemy of the wireworm, did it but make a thorough job of the elimination of the pest and left the crop unmolested. In the field in question, however, the wireworm infestation was still high in the autumn despite the close attentions of the rook throughout the whole of the preceding summer months. In such cases it would be difficult to convince farmers that the rook's activities are beneficial to agriculture.

GREENFINCH AND LEATHER-JACKET DAMAGE TO FLAX.

An interesting instance of wholesale destruction to flax seedlings was reported by Mr J. W. Hall,¹ Horticulturist, East of Scotland College of Agriculture, from variety trial plots, at the College Garden, Cupar, Fife. Damage was first noted at the end of April, four weeks after the plots had been sown and two weeks after the seed had germinated.

The braird was satisfactory in every respect, but soon it was observed that growth throughout the plots had come to a standstill, and the seedlings had been severely thinned out. The notable feature about the damage was its uniform character. Affected seedlings had all been similarly injured, the upper portion of the stem and seed-leaves having been removed, leaving about a quarter of an inch of the basal part of the stem projecting from the soil and not a trace of the top. The nature of the injury suggested a variety of probable agents, including insects, slugs, wind and birds, but the plots were found to be remarkably free from such soil-infesting pests as wireworms, cutworms, leather-jackets, millepedes and slugs, all of which have the exasperating habit of trimming seedlings at or near ground-level. Springtails, too, were ruled out of consideration, since it seemed unlikely that they should concentrate their attacks on the exposed part of the seedling stems well above the soil surface; and, further, they were far from being so numerous as to explain the extensive character of the damage.

The possibility that strong winds may have broken the seedlings was explored, but the fact that flax seedlings in adjacent fields as well as seedlings of various kinds in nearby market-garden plots were undamaged, served to explode the wind theory.

¹ Hall, J. W. (1943). "Bird Damage to Flax Seedlings," 'Scottish Farmer,' Vol. LI, No. 2646, p. 947.

Suspicion then definitely fell upon birds, and whilst hawthorn hedges near the plots teemed with greenfinches, only an occasional one was observed on the flax plots during the day when workers were about. At all times they proved to be particularly wary of human beings, and made themselves scarce at the slightest approach.

To test the theory of bird-damage an experiment was conceived in which two small beds were sown to flax ; one of these was enclosed with a double layer of netting supported on stakes three feet high and made of a mesh small enough to exclude small birds. The second bed was left unprotected. As soon as the seed had germinated watch was kept from early dawn each day, and vigilance was soon rewarded. On the first morning, about 5 A.M., a flock of about thirty greenfinches was seen to settle on the unprotected bed, where they created havoc among the seedlings, devouring the tops and reproducing the damage which had been previously observed in the open trial plots. The protected bed was left unmolested for a few days, but finally it also fell prey to marauding greenfinches that gained access to the seedlings through a defect in the protective netting.

From all this it would appear that flax seedlings are very attractive food to greenfinches during their nesting season, and their destructive activities are likely to be overlooked by reason of their habit of feeding very early in the morning. Extensive damage, such as that which was observed at Cupar, is only likely to occur where dense hedgerows suitable as nesting sites for greenfinches are situated close to flax plots and fields.

Despite the serious nature of the injury which the seedlings experienced at a very susceptible stage of their development, in a few days they contrived to make recovery by producing each three or four adventitious buds to replace the destroyed main shoot. Gradually these developed into sizeable lateral shoots, but during the period of their growth they had to contend with a strong overgrowth of weeds, which managed to get a firm footing when the plots were first attacked. The result was that considered as variety trials the plots were a complete failure, and little could be said for the flax judged as a crop.

Experience in 1943 showed that the Leather-jacket or Grub could also be a serious menace to flax where the crop is sown on land recently ploughed out of old lea or pasture. At the end of April extensive damage to a sixteen-acre field of flax near St Andrews was reported by Mr J. C. F. McIntyre, County Organiser for East Fife. The field was found to be heavily infested with Leather-jackets, which were readily recovered from beneath loose pieces of turf and from the soil near the surface. The symptoms exhibited by grub-injured flax seedlings were found to bear a close resemblance to those damaged by greenfinches, with the difference that the cut ends of the stems of the former were generally prolonged into a wisp of withered tissue, whereas those of the latter were nipped neatly across, leaving no sign of a terminal shred. Grub-injured seedlings responded exactly like those beheaded by greenfinches, sending out adventitious buds which developed into lateral

shoots giving the plant a shrub-like appearance. Indeed, injury to the stem or hypocotyl of the seedling which destroys the growing point and seed-leaves, no matter how contrived, will induce the production of adventitious buds.

THE HAY OR PALE MOTTLED WILLOW MOTH (*Caradrina clavipalpis*).

In November 1943 a heavy infestation of hayricks by a caterpillar was reported from a Fifeshire farm. The insects were first observed by farm workers engaged in loading hay from stacks into carts. The caterpillars were present in thousands and had done considerable damage to the hay, which they had cut into small pieces. After the carts had been emptied of their loads, the caterpillars were exposed in masses on the floor and sides of the vehicles,

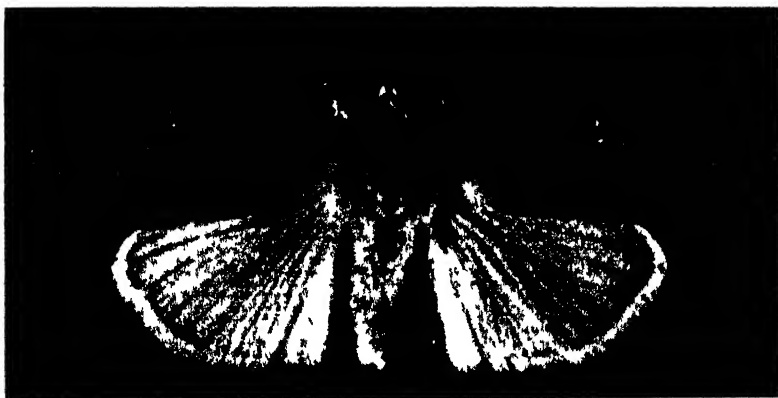


Fig. 5.—*Caradrina clavipalpis*. The Hay or Pale Mottled Willow Moth. Female. $\times 2\frac{1}{2}$.

From nature

where they had crept when disturbed by the handling of the hay. Many of the caterpillars, which were sent for identification on 1st November in a sample of hay, were found enclosed within loosely constructed cocoons composed of particles of hay spun together by silk threads.

Reference to *C. clavipalpis* was made by MacDougall¹ in the 'Transactions' of the Society in 1932 as proving a nuisance in dwelling-houses and shops. In this regard the caterpillar appears to share the migratory habit of others of the family *Noctuidæ*, so-called Miller or Owlet Moths, to which the Hay Moth belongs.

Description and Life-cycle.—The moth (Fig. 5) has a wing-spread of $1\frac{1}{4}$ in. The fore-wings are greyish-buff with a burnished coppery sheen and are traversed by dark zig-zag lines, which end in distinctive dark spots at the front margin. The latter appear to be the most constant of all its colour characters. The outer margins of the

¹ MacDougall, R. S. (1932). "Insect and Other Enemies of 1931." Trans. High. Agric. Soc. Scot., Vol. XLV., pp. 132-133.

fore-wings are likewise emphasised by a close series of dark spots, on the inside of which there is a pale zig-zag line edged with coppery brown. The hind-wings are white, relieved with brown lines proceeding from the base to the margin, which is also tinted brown. In colour the body is like that of the fore-wings, and the head is distinguished by the conspicuous dark eyes and stout palps.

The moths are on the wing during July and August, resting during the day among herbage, in hay- and corn-stacks, or even indoors in stables, barns, granaries and houses, and flying at dusk. The eggs are laid out-of-doors among hay, wheat, peas and weeds, on which the young caterpillars feed.



Fig. 6.—*Caradrina clavipalpis*—Caterpillars of the Hay or Pale Mottled Willow Moth

From nature About natural size The caterpillars are present in a sample of damaged hay

The caterpillar (Fig. 6) measures $\frac{3}{4}$ in. in length at full growth. Its colour is variable from a greenish to a pinkish grey and appears all of a piece with its environment of dried hay. Along the back and sides is a series of indefinite and interrupted dark lines, often very faint. The breathing pores, of which there are nine on each side, are rendered conspicuous by their black colour.

During the late summer and autumn the caterpillars continue feeding, becoming full-grown in October, when they spin up the loosely woven cocoons or cubicles, in which they remain dormant all winter, transforming to reddish-brown chrysalids in May. Their presence in stackyards is explained by their being harvested with the crops, hay, corn or peas, and from infested stacks they

wander to neighbouring houses and stores, where they may assume the habit of pests of stored produce, damaging seeds, grain in the ear, meal, and fruit. In connection with the last of these commodities, Theobald¹ recorded an interesting case of infestation in a fruit store at Blairmore, where the caterpillars, which were suspected of issuing from the thatched roof, attacked apples, pears, peaches, cucumbers, and marrows. MacDougall's records (*loc. cit.*) of its domesticated habits concerned its invasion of dwelling-houses and a shop in the Edinburgh district, and dwelling-houses in Linlithgow, South Perthshire and Dumbartonshire, to which they gained access by climbing the walls and entering through open windows and chinks. The origin of the invasions was found to be nearby infested haystacks or stables.

Hypopi on Caterpillars.—Specimens of the caterpillars collected in Fifeshire in November were kept alive but inactive in a refrigerator during the winter at temperatures below freezing, 26°-29° F. When examined in February they were found to be infested with hypopi of a forage mite (*Tyroglyphidæ*) living in the hay in which the caterpillars were kept. The hypopal stage in the development of forage and similar mites is a resistant one which is assumed to tide them over unfavourable circumstances, such as cold, lack of moisture and starvation, and in this stage they remain dormant indefinitely, incapable of feeding until normal conditions are re-established. Hypopi are frequently found attached to the smooth, polished surfaces of insects, and so they are transported here and there, perchance to a favourable environment, where the hypopus moults its skin and gives rise to a form capable once more of leading an active existence. On the caterpillars of the Hay Moth, the dormant hypopi were clustered on the smooth surfaces of the head and bases of the legs.

THE HEATHER BEETLE (*Lochmwa suturalis*).

Infestations of the Heather Beetle have occurred periodically on Scottish moors in all parts of the country, and have been responsible for much damage to both young and old heather. Whereas the former usually recovers from even severe attacks by sprouting fresh shoots, older heather may be completely destroyed and replaced by undesirable white land. In Scotland as a whole the period of the last heather-beetle outbreak extended from 1933 to 1938, beginning first on the moors of the north and west and developing later on those of the east and south. The implications of these periodic outbreaks are far-reaching, since the destruction of young heather deprives the grouse of the main source of its summer food supply, lowers the value of infested moors as sheep grazings, and adversely affects the yield of honey in apiaries by the reduction of blossom.

In the summer of 1942, four years after the termination of

¹ Theobald, F. V. (1913) "Report on Economic Zoology." Jour. S.E. Agric. Coll., No. 22, pp. 210-212. Wye, Kent.

the last large outbreak, russeted heather showing the well-known symptoms of beetle attack was observed by a gamekeeper in small local patches on a Perthshire moor. In 1943 there was an extension of the damage on this and other moors, not only in the same county, but also in northern and southern counties. Judging from the vast numbers of the beetle which entered hibernation in the autumn, there appears to be every likelihood of a serious infestation in 1944.

During the last outbreak an account of the Heather Beetle and its habits based on actual field work was published in the Society's 'Transactions' of 1937. In June of that year, an investigation of the beetle was undertaken by the Department of Agricultural and Forest Zoology of the University of Edinburgh at the request of the British Field Sports Society, and completed in 1939. Publication of the report was postponed owing to the outbreak of war, but is now in the press. In the control of the pest the report stresses the value of efficient moor husbandry, and advocates the practice of draining damp areas to eliminate the sphagnum breeding-places of the beetle. With this there should be combined a planned policy of rotational moor-burning aimed at eliminating worthless stick heather and replacing it by a flush of naturally regenerated young heather. Experience has shown that well-husbanded moors suffer less damage from heather-beetle attacks than those that are neglected.

THE STABLE FLY (*Stomoxys calcitrans*).

Of the many flies that occur around farmyards and byres none is better known to the dairyman than the Stable Fly. Actually its common designation is a misnomer, since the insect is more closely identified with cow byres than it is with horse stables, and its preferred host is cattle, although it will bite and feed on other domestic animals and even on man himself. In summer it is no unusual experience to find it in rural houses on or near farms, and this domestic habit, together with its propensity for attacking human beings, has earned it the alternative name of 'The Biting House Fly.' Of all British blood-sucking flies it has become the most domesticated, and in the art of making itself at home in houses and farm buildings it has been only less successful than the non-bloodsucking House Fly.

Description of the Stable Fly.—By the inexperienced the Stable Fly (Fig. 7A) might be excusably mistaken for the House Fly (Fig. 7B). Both are a sombre grey with four narrow black stripes on the middle part of the body, and they are about the same size and shape; but the resemblance practically stops here. The Stable Fly is provided with a rigid spike-like proboscis projecting forward from the head, with which it pierces the skin of its victims and draws blood. The similar structure in the House Fly is withdrawn into a recess under the head and exposed only when the insect is feeding on attractive and accessible liquids; it is incapable of puncturing human or animal skin.

The pose of the wings is dissimilar in the two flies. Those of the Stable Fly are held divergent at rest, whilst those of the House Fly overlap each other.

On the hind part of the body of the Stable Fly there are three series of prominent, dark, round spots, which have no counterpart in the House Fly.

Life-cycle.—The Stable Fly and House Fly have similar life-histories, and are found breeding in the same general class of substances—namely, animal excreta and decaying materials of vegetable origin. However, their preferences are not identical, and whereas the House Fly is attracted by manure piles consisting either of horse and pig dung, the Stable Fly is drawn more to old and well-baked cow manure in middens containing an admixture of

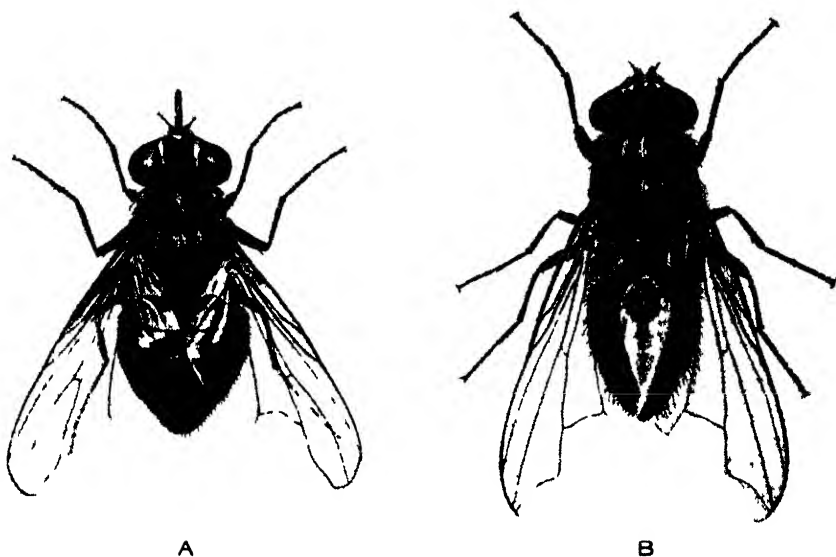


Fig 7 A, *Stomoxys calcitrans*. *Stable Fly* Female. $\times 5$
B, *Musca domestica* *House Fly* Female. $\times 5$.

After Thomson.

straw. Thomson¹ is of the opinion that old cow manure is the only breeding material of importance, but the Stable Fly has been recorded as developing in fermenting oat straw contaminated with manure, and also in the moist decaying refuse of haystacks and in grass-mowings.

Before proceeding to the business of laying its eggs, the female Stable Fly requires two or three blood meals. The eggs are then deposited in crevices of the breeding material in batches of anything from 5 to 25, and the process is continued until all the eggs, amounting to 500 to 600, are laid. After each egg-laying the fly again visits a host animal in order to acquire a further one or two blood meals, and it may continue to live for three or four weeks.

¹ Thomson, R. C. M (1937). "Observations on the Biology and Larvæ of the Anthomyiidae." *Parasitology*, Vol. XXIX, No 3, pp 273-358.

According to Bishopp,¹ the temperature conditions which induce Stable Flies to feed are those in excess of 55° F., and for successful breeding Thomsen and Hammer² consider that the temperature range should be 68°-79° F.

In passing, it should be noted that the fresh dung of cowpats in the field is neglected by the Stable Fly, although there is a number of other flies which find it entirely suitable for their breeding.

The eggs are $\frac{1}{16}$ in. long, white, and bear each two parallel ridges between which is a furrow. Two days after the eggs are laid the maggot forces its way through a rift in the egg-shell, on one or other side of the furrow, and begins its free existence. It feeds on the semi-liquid products of organic decay in the breeding material and completes its growth in two or three weeks, when it then measures about $\frac{1}{2}$ in. long. Like all fly maggots, it tapers to the fore end and is blunt behind. It is yellowish-white in colour and somewhat transparent.

The maggots pupate in the breeding medium. The cases containing the pupæ are brownish-red and about $\frac{1}{3}$ in. long. Development of the pupæ occupy two to three weeks, and from each pupal case there emerges an adult Stable Fly.

The whole life-cycle is completed in about six weeks, and the number of annual generations is three or four. It is not unlikely that breeding may continue throughout the winter in cow byres, where prevailing temperatures of about 60° F. occur, but the scarcity of the Stable Fly indoors in byres in the winter appears to indicate that it hibernates either as a maggot or as a pupa. From a review of the literature on the Stable Fly, there would seem to be scope for further investigation of its life-cycle and habits.

Habits of the Stable Fly.—The season of activity of the Stable Fly extends from April, when it first makes its appearance in cow byres, until about the middle of November. In the byre it persistently bites the cattle, and the irritation which accompanies the bites is such as to induce continual restlessness. In their efforts to dislodge the flies from their legs where they usually settle, the animals kick and stamp with their feet, and this continual movement in a dairy herd does not ease the task of the dairymen at milking time.

When the operation of milking has been finished and the cattle have returned to pasture, the flies remain behind in the byres and are found resting on the stall partitions, stanchions and walls, or may be seen running on the windows or flying about aimlessly. Outside, late in the season, a goodly number are always to be found on walls and doors basking in the sun, and making short, swift flights when disturbed.

In the fields the numbers of Stable Flies attending the cattle appear to be comparatively small compared to those indoors, and those that do occur are usually found settled on the backs of the

¹ Bishopp, R. C. (1939). "The Stable Fly." *Farmers' Bull.* U.S. Dep. Agric., No. 1097.

² Thomsen, M., and Hammer, O. (1936). "The Breeding Media of Some Common Flies." *Bull. Ent. Res.*, Vol. XXVII., Pt. IV., pp. 559-587.

animals. Each time that the cattle are brought to the byre for milking, fresh relays of flies are introduced, but many find their way indoors independently from the breeding-places of the middens or adjacent cattle courts, where the floors are heaped with dung and straw.

There is nothing that can be said on behalf of the Stable Fly, save that, so far as is known, it does not act as a transmitting agent of any disease affecting the health of cattle. There is, however, a minute worm parasite of the horse (*Habronema microstoma*), of which the infective stage occurs in the Stable Fly and is passed to the horse through its skin, when the fly visits the host to feed. The suspicion that the Stable Fly may be one of several flies concerned in the transmission of mastitis has not been confirmed.

Control.—(1) So far as the destruction of the flies themselves are concerned, insecticidal sprays can be advantageously used in cow byres. The spraying method, whilst it gives temporary relief to cattle from the pestering attacks of the flies, is, however, merely a makeshift.

(2) The only satisfactory method is proper disposal of the manure so as to render it unsuitable for the breeding of *Stomoxys*. This can be achieved by the process of close-packing, which increases the heat of fermentation in the manure pile beyond the range which the maggots can tolerate. Alternatively, the manure may be dumped on a low, wooden, slatted platform, constructed over a concrete basin containing water. Maggots in the manure drop through the spaces between the slats into the water and are drowned.

BOVINE SARCOPTIC MANGE (*Sarcoptes scabiei*, var. *bovis*).

Kinds of Mange in General.—Mange, known also as Itch or Scab, is a disease which affects various domestic and wild animals, as well as human beings. The condition is due to the activities of minute parasitic mites infesting the skin. Different kinds of mange are distinguished according to the particular mite concerned, and are designated as sarcoptic, notoedric, enemidocoptic, psoroptic, chorioptic or symbiotic, and otodectic. Of these the enemidocoptic type is confined to birds, there being two varieties, one of which is known as Scaly Leg, and the other Depluming Itch. The otodectic type is restricted to the ears of its hosts, which are cats, dogs, and ferrets.

Symptoms.—The remaining types of mange are distributed among herbivores, carnivores and rodents, and the symptoms are very much alike in all. It is not uncommon for one and the same animal to suffer from a mixed mange infection. The disease usually appears on a particular part of the body to which it may be confined, but it tends to become generalised if neglected. The mites either burrow into the skin, making short winding galleries about an inch long (sarcoptic), make pits (notoedric), or remain on the surface covered by scabs (psoroptic, chorioptic, and otodectic). They feed by piercing the skin with their mouth-parts and ingest

the serum which exudes from the punctures. Since more serum is exuded than can be taken up by the mites, the unused excess dries and hardens to form scabs, which are such a prominent feature of the disease. The hair, too, becomes matted, and bare patches denuded of hair are developed.

Diagnosis.—In order to differentiate one kind of parasitic mange from another, and these again from non-parasitic skin diseases,

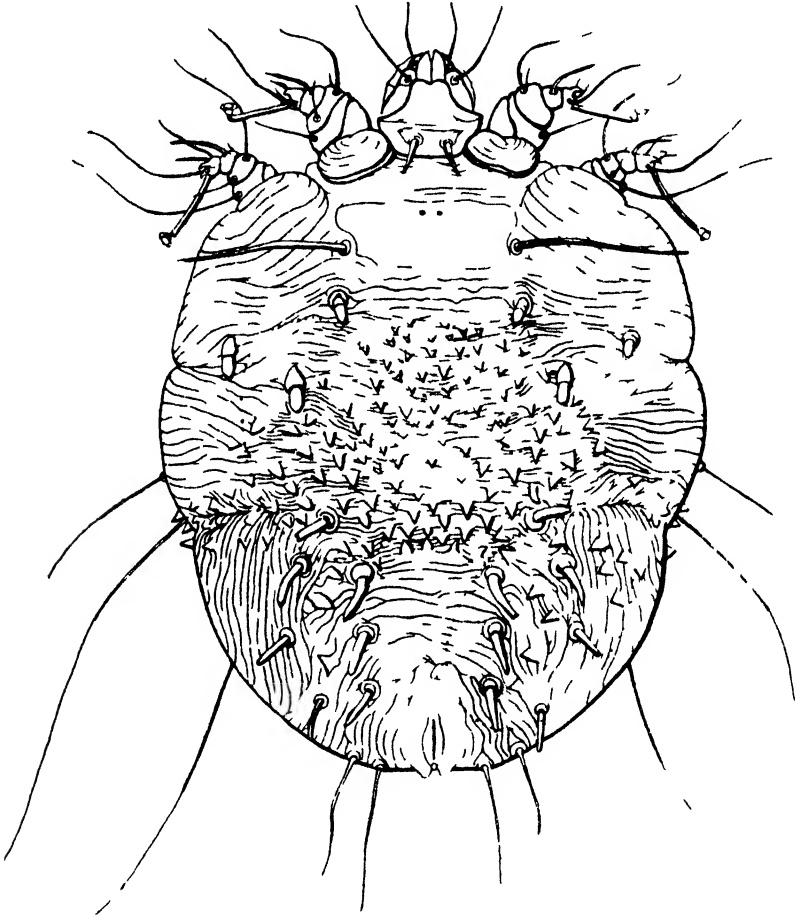


Fig 8 —*Sarcoptes scabiei* *Sarcoptic Mange Mite* *Female* × 200
After Hirst

diagnosis must finally depend on the discovery and identification of the mites. The procedure consists in taking deep skin scrapings and examining pieces of detached scab, after teasing, under the microscope. If mites are not discovered, further pieces of scab should be macerated in a 10 per cent solution of caustic potash for twenty-four hours, and this is again examined with a microscope.

Effect of Mange on Host Animals.—Parasitic Mange, accompanied as it is by inflammation and cracking of the skin, sets up in the host

an intense irritation, which it attempts to relieve by rubbing itself against any fixed object or against other animals. Incidentally, infective scabs are detached, by which the disease is spread to fresh hosts. Of the various kinds of mange the most serious, apart from psoroptic mange of the sheep or Sheep Scab, is the sarcoptic type. The mite of the latter burrows beneath the surface of the skin making galleries, and sarcoptic mange on this account usually proves refractory to treatment.

Notifiable Mange.—According to the Diseases of Animals Act, four kinds of mange are notifiable—namely, psoroptic and sarcoptic of the horse and the same of sheep.

Host Specificity.—The mite of sarcoptic mange is *Sarcoptes scabiei*, which is found infesting many kinds of animal. So far as the eye can judge, they are all alike, but the different forms tend to stay with one particular kind of host. For instance, the sarcoptic mange mite of the horse is apparently not readily transmissible to cattle, although it may cause transient infections in man. Again, the cattle form thrives best on bovine hosts, but may be transferred to human beings, where it sets up the condition in farm workers known as ‘dairymen’s itch.’ *Sarcoptes* of the pig is likewise transmissible to man.

Distribution of Bovine Sarcoptic Mange.—There does not appear to be any definite information concerning the distribution and prevalence of sarcoptic mange of cattle in Britain. According to Hirst,¹ “sarcoptic mange in cattle seems quite common in Scotland,” but he does not state the source of his information. He remarks that it “also occurs at Liverpool, and doubtless in other areas.” MacDougall² (1916) likewise commented on the prevalence of sarcoptic mange in cattle, but did not record localities. Evidently, further information on the question of its prevalence and distribution is desirable.

Recent Scottish Cases of Bovine Sarcoptic Mange.—In December 1943, Mr M. Maclellan, Veterinary Surgeon of Lochboisdale, South Uist, reported a suspected case of mange in a bull to Professor G. F. Boddie, Royal (Dick) Veterinary College, Edinburgh. An examination of skin scrapings demonstrated the presence of *Sarcoptes scabiei*. The bull in question had been introduced into North Uist from the mainland, and was said to have shown no sign of skin disease on its arrival in March 1943. Later, scrapings were obtained from five further suspected cases of mange, including a cow, three stirks, and a calf, from North and South Uist. Of these two were positive for *Sarcoptes* only, one had a mixed infection of *Sarcoptes* and *Chorioptes*, and one proved negative. From Inverness-shire, on 25th January 1944, in skin scrapings of two bulls, pure cultures of *Sarcoptes* were diagnosed.

Life-history.—*Sarcoptes* is a roundish-oval mite of microscopic dimensions, the female (Fig. 8) measuring $\frac{3}{16}$ in. long and the male (Fig. 9) $\frac{1}{16}$ in. The legs, of which there are four pairs, are

¹ Hirst, S. (1922). “Mites Injurious to Domestic Animals.” Brit. Mus. Econ. Ser., No. 13. London.

² MacDougall, R. S. (1916). “Insect and Arachnid Pests of 1915.” Trans. High. Agr. Soc., Scot., Vol. XXVIII., p. 118.

short and stumpy, arranged in two sets, two pairs in front and two behind. In the female, the two hind pairs do not project beyond the margin of the body, which is beset with spines and scales on its upper surface. Certain of the legs (Nos. 1 and 2 of the female, and 1, 2, and 4 of the male) end in a stalk which bears a sucker, the remainder in a long, slender hair.

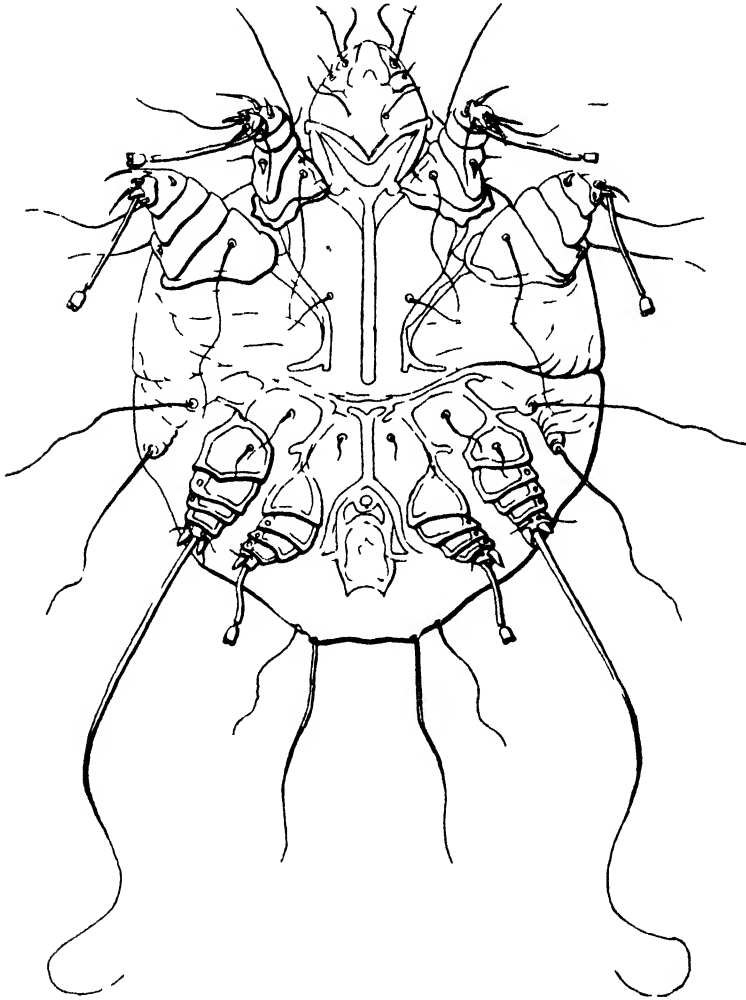


Fig 9 — *Sarcoptes scabiei*. *Sarcoptes Mange Mite* Male $\times 300$
After Hust

The incidence of *Sarcoptes* is always highest in the winter months, October to March.

The female burrows into the skin of the host, making a winding gallery of about an inch long, which contains eggs, young, and excrement, with the female at the far end. The eggs, which are laid one at a time, hatch in three to seven days. The newly hatched

mite or *larva*, which has but three pairs of legs, feeds for three or four days, when it sheds its skin and transforms to a second form called the *nymph*. This, too, feeds for three to four days, and, casting its skin, becomes either a mature male or an immature female. The two pair, and the latter casts its skin a third time and develops into a mature female ready to make a new gallery and to produce and lay eggs in one or two days after reaching maturity. The female, it should be noted, is of all the forms alone capable of making a burrow.

The female lives for about a week on the host, and may continue alive for ten days to three weeks when detached from the host.

Control.—Cases of sarcoptic mange should be carefully treated with a dressing to kill the mites. Previous to treatment, the hair should be clipped to expose the affected areas of the skin, and the clippings burned. The scabs should then be softened by rubbing with wisps of hay soaked in warm, soapy water, and these again are burned. The dressing is then applied at intervals of four days all over the body until a cure is effected and mites are no longer found. A lime-sulphur solution makes an effective dressing. It can be purchased ready-made, or may be prepared by taking 2½ lb. sulphur and 1 lb. quicklime and mixing the two into a paste with a small quantity of water. The mixture is then tied up in a cloth bag, suspended in a boiler containing two gallons of water, and boiled for three hours with occasional stirring. The resulting solution, which is an amber colour, is made up to two gallons with water. Two pints of the liquid are sufficient to treat one case.

AGRICULTURAL RESEARCH IN SCOTLAND IN 1943.

BEING A BRIEF SUMMARY OF THE WORK AT THE
SCOTTISH AGRICULTURAL RESEARCH STATIONS
AND AGRICULTURAL AND VETERINARY COLLEGES
DURING THE YEAR.

*Readers desiring fuller information on any of the subjects mentioned
should write to the Director of the Station at which the investigation
is being carried out.*

INSTITUTE OF ANIMAL GENETICS.

UNIVERSITY OF EDINBURGH, WEST MAINS ROAD.

Dairy Cattle.—During the past ten years there has been an appreciable number of occasions on which cows showed heat during pregnancy and were mated. The number of services for such heats was of the order of 5 per cent, and some took place quite late in pregnancy. This has an obvious bearing on the disposal of cows for assumed sterility and on the paternity of a calf. Apart from the continued study of the inheritance of milking qualities, useful trials have been made of iodinated-protein and iodinn. Since the herd has been freed of mastitis, it is increasingly interesting to see whether it can be kept so.

Pigs.—The genetical analysis of productive characters has been continued with Large White, Wessex, and Gloucester Old Spot pigs.

Poultry.—Genetical and physiological investigations on reproductive activity in the Brown Leghorn fowl are being pursued.

ANIMAL DISEASES RESEARCH ASSOCIATION.

MOREDUN INSTITUTE, GILMERTON, MIDLOTHIAN.

The investigations upon which the Association has been engaged in recent years are being continued. These include grass sickness in horses, lactation tetany in cows, white scour and allied diseases in calves, scrapie, enzootic abortion in ewes, tick pyæmia, and pinning in sheep and young cattle.

The systematic investigation of parturient redwater in cows is being continued, and arrangements have been made for the Association to take part in a co-operative programme of research, designed on a national scale, upon the important problem of mastitis in dairy cows.

THE ROWETT RESEARCH INSTITUTE.

BUCKSBURN, ABERDEEN.

Research Institute.—Early in the war all the men research workers who were physically fit joined the fighting forces, and a number of women were taken over by the Ministry of Food. There was, therefore, a marked decrease in the volume of research work, but in 1943 some temporary workers were taken on the staff, and the research programme is now being expanded.

The main lines of research are as follows:—

1. *Influence of feeding of the mother on the viability and rate of growth of the offspring.*

In feeding experiments with laboratory animals, the effects of deficiencies or excesses of certain minerals and synthetic vitamins on the health and vigour of the offspring and on the lactation of the mother have been studied, and attempts been made to correlate the clinical conditions in the young with specific defects in the diet of the mother. It has been found that excesses of certain food constituents may interfere with the utilisation of others. The results so far obtained emphasise the known importance of nutrition in intra-uterine life and in lactation.

2. *Iodine.*

As part of an investigation by a Committee of the Medical Research Council, the iodine content of water in different districts in Scotland and England is being determined on the assumption that this will give an indication of the total iodine intake in the district. All the analytical work is being done at this Institute. A clinical survey on human beings is being made to ascertain whether there is a correlation between the iodine content of the drinking water and symptoms of ill-health attributable to iodine deficiency. Of fifty samples of water from different districts in Scotland, some have been found to have an iodine content so low that symptoms of deficiency might be expected. If such are found in human beings, it will be necessary to investigate the possible occurrence of comparable symptoms in animals and to test the effect of administration of iodine.

As part of an investigation being carried out by a Committee of the Agricultural Research Council, an experiment was done on the effect on milk yield by feeding iodised protein. In the preliminary experiments done two years ago

in the summer, the results were negligible. In later experiments, using larger amounts of iodised protein, a definite increase in yield, as much as 25 per cent in some cases, has been obtained over a three-week period. The results indicate that iodised protein can be used to get at least a temporary increase in yield. Whether there will be an increased yield in the total lactation or the temporary increase be compensated for by a later decrease is not yet ascertained.

3. *The nutritive value of oatmeal.*

The amount of vitamin B₁ in different species of oats is being determined. This vitamin is important in human nutrition. The data so far available indicate that oats are specially rich in this vitamin. Other nutritive qualities of this foodstuff are being investigated, especially the influence of oatmeal on the assimilation of the calcium and phosphorus needed for skeletal growth.

DUTHIE EXPERIMENTAL FARM.

As a war measure, the Duthie Experimental Farm and the Craibstone Farm of the North of Scotland College of Agriculture are being run as one unit. The main objective of the work is still maximum food production and the demonstration of methods to achieve this. A number of demonstrations and conferences for farmers on problems of food production have been held, and have been well attended.

Investigations into the losses and changes in food value, especially the loss in vitamin C during storage, are proceeding in co-operation with the Plant Pathology Laboratory of the Ministry of Agriculture. A considerable tonnage of potatoes has been stored under different methods, and the extent and types of rot at different stages of the storage period are being investigated.

An investigation into the unexplained differences between farms in the North-East of Scotland in their ability to fatten cattle is in progress.

THE SCOTTISH PLANT BREEDING STATION.

CRAIGS HOUSE, CORSTORPHINE, EDINBURGH.

It is customary each year to describe briefly in the 'Transactions' one aspect of the plant breeding activities of the Station, which include experiments on cereals, potatoes, herbage plants, root crops, and vegetables. On this occasion the subject-matter is confined to potato virus diseases.

Since this subject was last reviewed in the 'Transactions' of 1940 investigations have been made into (1) the relationships of certain potato viruses; (2) the inheritance of the hyper-sensitive

characters determining field immunity from certain viruses ; and (3) the potentialities of South American and Mexican species of potatoes as sources of resistance to potato viruses. In the matter of virus relationships it has been shown that virus B is closely related to virus X, and that it may, indeed, be considered a strain of the latter. Similarly, virus C has been shown to be related to virus Y. Both these viruses, B and C, have been found to occur alone in uncontaminated condition and to be the causes of mosaic diseases. Viruses of many kinds have been found infecting the collection of South American and Mexican species. Many of these infections have proved to be viruses of common occurrence in this country. Others appear to be aberrant strains of these common viruses, but there are at least three which seem to be unrelated to any potato viruses previously recorded.

In certain potato varieties the absence of mosaic diseases caused by one or more of the viruses X, A, B, and C has been correlated with a hypersensitive reaction to each of these viruses, and the varieties have been described as field immune from them. The inheritance of the field immune characteristic has been followed in considerable detail with regard to each virus. Most field immune varieties owe their particular qualities to the presence of a single factor which, in breeding with susceptible varieties, is transmitted to approximately one-half of the progeny. A few varieties have been found to have two identical factors in their constitution, and to produce at least three field immunes to one susceptible in crosses with susceptible varieties. Inheritance of field immunity is thus relatively simple, and no difficulty has been met in bringing together the several factors necessary to combine field immunity from each of the viruses against which it gives effective protection. Breeding for this combination, together with resistance to leaf roll and immunity from blight, is now in progress.

The possibilities of there being forms of resistance to potato viruses in the 'wild' potatoes of the American continent have been explored in an examination of 120 clones representative of 35 different potato species native to South America and Mexico. The factors determining field immunity from viruses X, A, B, and C have been found to be well distributed throughout this material. In addition, certain plants have withstood repeated attempts to infect them with one or more viruses, and there is indication of the presence within them of factors determining positive resistance against infection. Trials with the leaf-roll virus and virus Y are not yet complete. Most plants have shown symptoms of infection with virus Y, though a few have so far failed to accept the virus either through graft unions or aphid feeding. In a few cases very violent reactions to graft infection, similar in effect to those indicative of field immunity when the virus concerned is X, A, B, or C, have been obtained with virus Y, but there is yet no evidence that these reactions are also indicative of field immunity.

A preliminary investigation has also been made into the possibility that resistance to aphid-borne viruses may be achieved in

plants resistant to aphid attack. Certain plants have shown resistance against aphides, but they have nevertheless proved susceptible to infection. These new aspects of virus resistance are receiving increased attention.

THE HANNAH DAIRY RESEARCH INSTITUTE.

KIRKHILL, Ayr.

Farm Self-sufficiency.—Earlier work towards achieving self-sufficiency in supplies of feeding-stuffs for the dairy herd has already been published. In the past year the work has been continued on other aspects of the problem. One of the points which has become clear in recent work is that, while grass silage forms a valuable basis for winter feeding, it is desirable, in addition, to grow alternative high protein crops in case of the failure of the output of grass to meet the needs of both grazing and ensiling. Beans form an ideal constituent of the production ration of dairy cows, but some doubt exists as to the best methods of cultivation and the best fertiliser treatment for this crop. Plot experiments have therefore been undertaken to determine the best conditions for the growth of beans in the south-west area of Scotland. The effect on the bean crop of dressings of manure containing added boron has been investigated in detail.

The Storage of Feeding-stuffs.—The work on the storage of feeding-stuffs, which has as its object the determination of the optimum conditions for ensuring freedom from mould growth and other forms of deterioration, has been continued and extended. Two new aspects of the problem have been given special attention during the period under review. One is the influence of treating the feeding-stuffs with preservative agents either by simple admixture or (with oil cakes) by external treatment. The other is the interrelationship between moulding and 'heating,' since the latter form of deterioration constitutes the most serious problem in the storage of certain meals and cereal by-products.

The Diseases of Dairy Cattle.—In co-operation with the Agricultural Research Council and the Scottish Board of Veterinary Science, research into some of the more fundamental aspects of mastitis has been continued with particular reference to the control of the disease and its treatment. Simpler methods of diagnosis have been worked out, and will be applied in the field. Work on the prevention of mastitis other than contagious is also in progress. The Institute has continued to co-operate in the diagnosis of contagious abortion and in the investigation of white scour in calves.

Dried Milk.—An investigation of the bacteriological quality of milk powders at present being manufactured in Great Britain

has been in progress during the past year. In co-operation with two other Research Institutes a study has been made of the effect of different pre-heating temperatures, different methods of plant operation, and different sources of raw milk on (a) the plate counts at various stages of processing and also of the dried powder, and (b) on the keeping quality of the powder. The results have shown that by increasing the pre-heating temperature, the storage life of good quality spray-dried milk can be increased from three or four months to about two years.

MACAULAY INSTITUTE FOR SOIL RESEARCH.

CRAIGIEBUCKLER, ABERDEEN.

Particular attention has again been paid to advisory work and problems of immediate practical importance, and, as before, close co-operation has been maintained with other research centres. The work in the various departments may be summarised as follows :—

Advisory Work.—The Institute has continued to carry out soil testing on behalf of farmers in the North of Scotland. This work is done free of charge, and during the year over 4000 samples of soil have been examined and relevant advisory reports have been issued on the liming and manuring of the areas sampled. Most of these samples have been drawn from ordinary arable rotation land and old grassland ploughed for cropping, but a considerable amount of work has also been done on market gardens and allotments, landing-grounds, and Forestry Commission nurseries. Special attention has been given to the manuring of flax. The results again emphasise the widespread and pressing need for lime in the great majority of the soils.

General Soil Fertility Investigations.—Existing experiments on the effects of lime and phosphate have been continued, with particular reference to the study of phosphate fixation in the soil. Other work includes the study of fertiliser placement, especially combine seed fertiliser drilling of cereals, and the determination of the manurial value of potash in a crushed biotite schist.

Soil Classification and Surveys.—Since the need for a less detailed soil map than that provided by the primary six-inch survey has often been felt, a beginning has been made during the year with a reconnaissance survey on the scale of 2·5 inches to one mile. Some 250 square miles in Aberdeenshire have been surveyed so far. In addition, a further 24 square miles have been surveyed on the detailed scale, and small areas in Fife and Stirlingshire have been covered. Mineralogical studies on samples of soils collected during the survey have been continued.

Soil Organic Matter and Peat.—Considerable progress has been

made in the survey of the peat resources of Scotland which is being carried out in collaboration with the Geological Survey of Great Britain. Investigations on composts and the use of peat as a substitute for farmyard manure have been continued on the same lines as before.

Spectrographic and X-ray Work.—Spectrographic work has been further developed, with particular reference to trace constituents in soils, plants, and other substances of agricultural interest, and during the year some 7000 samples have been examined. Data are also being obtained in connection with the geochemical relationships of the trace constituents in Scottish soils. Amongst other X-ray studies, the clay fractions of soils have been investigated.

Soil Drainage and other Investigations.—Studies on the composition of the drainage water from the Craibstone Lysimeters have been continued. Other work includes: joint investigations with the Animal Diseases Research Association on cobalt manuring and pining in stock, and various other stock disease problems; differences in feeding value for cattle of the produce from good and poor feeding farms; and the study of soil conditions in relation to tree growth in conjunction with the Forestry Commission. The survey of Scottish limestones, undertaken in collaboration with the Geological Survey of Great Britain, has been completed.

EDINBURGH AND EAST OF SCOTLAND COLLEGE OF AGRICULTURE.

AGRICULTURAL BACTERIOLOGY.

Mastitis in Dairy Cows.—Work on control of the spread of infection by segregation was continued, and a second herd was freed from infection with *Strep. agalactiae*.

Observations made on a suckled herd of a beef breed indicated that the incidence of infection with *Strep. agalactiae* was remarkably low.

Potato Silage.—Studies were made on the microbiology of potato silage, and inoculation experiments were carried out.

Inoculation of Field Beans.—Tests of the value of inoculation failed to yield evidence of benefit. In the course of the work several complete failures of this crop were encountered. These are being investigated.

Utilisation of Straw.—Preparations were made for laying down an extensive series of field experiments on the practicability of ploughing in a long stubble with green manure crops undersown in the cereal.

AGRICULTURAL BOTANY.

Pasture Re-seeding.—Experiments are in progress on the improvement of poor pastures by ploughing and direct re-seeding to grass without a nurse crop. Trial is being made of the effects of varied dressings of lime and slag upon the growth and persistence of the sown grasses and clovers, upon the stock-carrying capacity of plots sown out with varying dressings of lime and slag, and upon the live-weight increases of sheep grazing upon the plots.

AGRICULTURAL CHEMISTRY.

The Chemistry Department dealt with over 6000 samples of soils, fertilisers, and feeding-stuffs. Of the soil samples about 1000 were ordinary routine advisory samples whilst some 600 came from experimental plots, airfields, and allotments. Generally speaking, about a third were very deficient in lime, phosphate, and potash, the lime and phosphate deficiencies being particularly marked in soils from old grassland.

Investigations on the value of phosphatic fertilisers were continued, and took the form of a comparison between broadcasting superphosphate and drilling it with the seed. The results indicated that the latter method was better, and the work is to be repeated.

An investigation on the change in composition of oats and barley during the growing season has shown how rapidly the percentage of protein falls after the emergence of the ears. Similar results have been obtained with grasses, clover, and lucerne. A convenient method of handling fresh crop for the estimation of carotene has been devised.

The studies on the composition of bracken (with the Botany Department) have been completed; the investigations on potato silage (with the Bacteriology Department) are being continued.

AGRICULTURAL ENTOMOLOGY.

Sheep Tick Investigation.—The sheep tick which is responsible for the transmission of louping-ill and tick-borne fever in sheep is being intensively studied in Peeblesshire and Perthshire with a view to discovering the conditions most favourable to its multiplication and devising suitable control measures.

Wireworm Survey.—During the past three years a survey has been made of the intensity of wireworm infestation in old grasslands and pastures. Wireworm infestation has proved to be less intense in Scotland than in England, and except in particular cases, where wireworm damage has been aggravated by rook activity, damage to crops generally has been substantially less in Scotland than in England.

VETERINARY INVESTIGATIONS.

Inquiries into the incidence of enzootic abortion in ewes were carried out. Bacteriological examinations confirmed previous observations that the disease is not due to any of the types of bacteria commonly associated with sheep abortion outbreaks in England. Soil and pasture samples were collected for chemical analysis from twenty-six farms.

A small trial suggested that the febrile phase in tick-borne fever could be effectively curtailed by treatment with a drug of the sulphonamide series.

Preliminary trials were made of phenothiazine-salt mixtures fed in troughs to sheep. The effects on the parasitic infestation in the host and on the pasture were studied.

THE NORTH OF SCOTLAND COLLEGE OF AGRICULTURE.

ABERDEEN.

The following are examples of the kind of experimental work being done. They are mainly in connection with the advisory services.

Grazings.—Large-scale experiments are being done on the management of heather-clad hill land and poor permanent pastures to devise the best method of increasing the nutritive value of the grazings.

Sheep Tick.—A study is being made of the life-history of some of the external parasites on farm animals. Experiments are being done to test the possibility of clearing tick-infested ground by heather burning, drainage, and improved management. Tests with pesticides and different methods of application are being done. A carbolic dip plus 2 lb. of Timbo per 100 gallons gave encouraging results.

Eelworm.—The varietal resistance of potatoes to eelworm is being studied. Epicure continues to show a higher resistance than any other variety. Experiments were done to test the efficiency of potassium iodide, copper sulphate, and mercuric chloride in controlling eelworm disease of tomatoes. Treatment with 0.8 oz. of mercuric chloride per square yard gave highly satisfactory results. These experiments are being repeated this season.

Diseases in Animals.—Methods of control of the spread of infection by improved management are being studied, and assistance is being given to the Moredun Institute in the investigation on parturient hæmoglobinæmia in cattle.

Cropping.—In a series of experimental plots at Craibstone which have been running for a number of years, tests are being made of some factors affecting yield, and a large number of different varieties of cereals, turnips, potatoes, and grasses are being compared. The value of early sowing has again been demonstrated. Even in the case of barley, there appears to be a better yield and a better standing crop with comparatively early sowing.

Horticulture.—Tests are being done to ascertain whether Russian varieties of tomatoes and the Canadian blueberry plant are suited to climatic and soil conditions in Scotland.

Ryegrass Seed Production.—A study of “Blind Seed Disease” of Ryegrass is being made and methods of control are being investigated.

THE WEST OF SCOTLAND AGRICULTURAL COLLEGE.

MILK UTILISATION DEPARTMENT.

Graded Milks.—The presence of coliform bacteria in graded milk supplies of low bacterial count continues to prove a cause of serious difficulty, and investigation of the source of the coliform organisms has been made in a number of cases. Certain strains of coliform organisms were found to persist on dairy utensils, following steaming to an insufficiently high temperature.

Dairy Products.—Various flavour defects in farm milk supplies, colour and flavour defects in cheese, and abnormal gassy fermentations in whey, have formed the subject of special investigation during the past year.

One case of particular interest came from a South of Scotland creamery. Persistent slowness in one single vat of cheese milk was encountered, while all the other vats worked normally. The slow vat contained milk from two farms only, and inquiry resulted in the farmer admitting having added a chlorine sterilising agent to his milk supply.

Repeated applications of the test recommended for the detection of chlorates failed to show their presence in the farm milk supply twenty-four hours after its delivery at the creamery. The stability of chlorates in milk would seem to be worthy of further examination.

The new brand of rennet referred to last year has again been under trial in our experimental dairy. Excellent cheese have been produced, but with perhaps less marked differences from cheese made with other brands of rennet.

An organism has been isolated from a number of creamery cheese showing a serious flavour defect. The same organism has been found in the supply of rennet used in the cheese-making.

Chemical Sterilisation.—At the request of the Department of Agriculture for Scotland a chemical detergent and steriliser for dairy use was submitted to exhaustive trial, particular attention being given to its value in the sterilising of milking machine units. As a detergent the product was found to possess the highest value when used on the dairy utensils. As a steriliser for milking machine units it was much inferior to steaming, which the product was meant to supplant.

ANIMAL HUSBANDRY DEPARTMENT.

Worm Burden of Lambs as Affected by Nutrition.—A controlled experiment on a hill farm was carried out to determine the effect of (1) proper nutrition and (2) vermifuges on the control of worm infestation. Vinquish (cobalt deficiency) was common on this farm, and post-mortem examination of an ailing animal had revealed 4000 worms in the stomach. Fifty Blackface and twenty-five Crossbred (B.F. × Border Leicester) lambs were selected and received monthly doses of 30 mg. cobalt in solution. Half of the animals in each group were also dosed with phenothiazine (5 g. or 10 g.). After two months the lambs which received *no* phenothiazine were 2 lb. per head heavier than those dosed with the drug.

Under the conditions of the experiment it was concluded that periodic dosing with cobalt is all that is necessary to keep the animals in health and ensure that parasitic worms are kept under control.

Effect of Cobalt on Delayed Œstrus in Ewes.—On hill farms affected with vinquish (cobalt deficiency) farmers complain of the large percentage of lambs dropped late in May. On four hefts all the ewes were individually dosed with a solution of cobalt at the beginning of November about a fortnight before mating with the tup. On all the dosed hefts lambing was completed by the first week in May, while on neighbouring undosed hefts lambing continued for a further three weeks. When considered in conjunction with the previous year's work, it now appears to be established that dosing of the ewes with cobalt in the autumn will result in the completion of lambing at the normal time.

Scour in Calves.—Outbreaks of scouring in dairy calves and their severity have declined each year since 1939, and it appears that the changed feeding practices in dairy herds are responsible for the low incidence in the offspring. In a previous report ('Transactions,' 1941) it was shown that while the feeding of vitamin A reduced the incidence of scouring attacks, other factors were involved. Two fractions of the vitamin B complex were distributed to veterinary surgeons in Ayrshire, and while only a few sporadic cases came to their notice they reported that one of the factors (nicotinic acid) had given good results. Recent research work in America has confirmed the value of this factor in the prevention and cure of scouring in calves.

Fertility Testing of Bulls.—On certain hill grazings in Perthshire, where the breeding records among the hill cattle have been poor, tests were carried out on ten bulls previous to turning them out on the hill for the mating of the cows. Semen samples, up to four from each bull, were collected by the artificial vagina and examined microscopically for concentration, motility, and normality of the sperm. The results showed that two of the bulls were in a sterile condition, two others only moderately fertile, while the remainder were producing healthy and vigorous sperm. The fertile bulls only were mated with the cows, and observations on the calf crop will show how much improvement can be effected under hill conditions by the elimination of sterile and semi-sterile bulls.

ROYAL (DICK) VETERINARY COLLEGE.

EDINBURGH.

Owing to reductions in staff, extra teaching duties, and limitations of transport facilities, research has necessarily been confined during the year mainly to observations on such material arising in the course of routine work as is not likely to make heavy calls on the limited time available for such work.

Department of Pathology, Bacteriology, Meat Inspection, and Poultry Diseases.—A detailed examination of the laboratory records for the past twenty-five years is being carried out. It is hoped that this will shortly be published, and will provide valuable data as to the incidence of disease in all classes of stock. Observations on bacterium coli have also been made, and a paper on the subject is ready for publication.

BACTERIOLOGY SECTION.

Research was continued as to the antigenic specificity of mycobacterium tuberculosis, avian type, and in connection with the work on bovine tubercle mastitis conducted by the pathology department, the isolation and typing of the organisms recovered from bovine udders are being carried out. A start was made with the classification by serological methods of all the hæmolytic streptococci met with during routine diagnosis and with the investigation of their biochemical reactions. A further paper on salmonellosis in ducks is awaiting publication in the Journal of Comparative Pathology and Therapeutics, and work on pyobacillosis of the sheep was continued.

PATHOLOGY SECTION.

Research has been focused mainly on two conditions, bovine tuberculosis and bovine mastitis.

Bovine Tuberculosis.—Complete and detailed post-mortem examinations of tuberculous cattle are the basis of this work. A large number of such cases have been fully examined, and results obtained which should very materially clarify the present rather obscure position as to the genesis of this disease, which may be applied to the problem of the control and eradication of tuberculosis in cattle. A statistical examination of slaughter-house records is being made, including data obtained from the city of Birmingham abattoir as well as from the Edinburgh abattoir, and should provide clear indications as to the common routes of infection and subsequent spread of tuberculosis in cattle of various age-groups.

Bovine Mastitis.—A great deal of work on the pathology of mastitis has been carried out during the past year, in collaboration with workers of the Animal Diseases Research Association, the Hannah Dairy Research Institute, the East of Scotland Agricultural College, and the West of Scotland Agricultural College. Large numbers of udders from mastitic cows have been examined, and results obtained which should prove of value in solving the problem of contagious mastitis. To evaluate the results satisfactorily it is necessary to have an exact picture of the normal anatomical and histological data, and work on the anatomy and histology of the bovine mammary gland is well advanced.

Poultry Department.—Investigations were continued on the incidence and classification of tumours of the fowl. •

During the year the following articles have been published by members of the above sections :—

- (1) "Tuberculosis of the Bovine Udder." By J. T. Stamp. (Journal of Comp. Path. & Therap. 53 : 220.)
- (2) "Congenital Atresia of the Ileum and Colon." By J. T. Stamp. (Veterinary Journal. 308.)
- (3) "Histiocytic and Fibroplastic sarcoma in the domestic fowl." By J. G. Campbell. (Journal of Comp. Path. 53 : 323.)
- (4) "A new species of trematode in the King Penguin." By J. G. Campbell. (Veterinary Journal. 99 : 291.)

Clinical Department.—Examination has been continued of the large amount of material which has been accumulated in the course of the long-term scheme of research on the disabling diseases of horses on which research has been carried out by various members of the staff of this college, under a grant from the Agricultural Research Council.

In the Medical Section, observations have been made on the following disease problems which have arisen in the course of the work of the section : (1) an investigation as to the extent to which cattle and sheep are affected with chronic fluoride poisoning as a

result of fumes from industrial undertakings. A large amount of valuable pathological material has been obtained which shows that marked changes of considerable economic importance are liable to be caused by such fumes ; (2) a survey is also being made of the incidence of parasitic infestation among cattle and sheep of the crofting communities of the North-West Highlands and Islands.

Anatomy Department.—Histological studies of the blood picture of the cow during and after pregnancy have been made. Observations also have been made on the skin glands of the horse, the blood supply of the foot of the horse, and the blood supply of the kidneys of the elephant and camel. During the year the following publications have been made in this department :—

- (1) “An ectopic kidney.” By T. Grahame. (Veterinary Record. **55** : 110.)

A fourth edition of Bradley’s “Anatomy of the Dog” was prepared and published.

- (2) “The Thoraco-acromial artery of the Dog.” By J. G. Speed. (Veterinary Journal. **99** : 163.)
- (3) “An abnormally developed pronator teres muscle in the Horse.” By J. A. Taylor. (Veterinary Journal. **99** : 310.)

MILK RECORDS.

FORTY-FIRST YEAR—RECORDS OF 40,476 COWS.

By JAMES A. PATERSON, Secretary-Superintendent,
The Scottish Milk Records Association.

SYSTEMATIC milk recording in Scotland was continued in 1943 under the direction of the Scottish Milk Records Association on the same lines as in previous years.

The Association in 1943 consisted of the following members of Milk Recording Societies :—

Name and Address.	Body Represented.
Mr E. A. Bell, 2 Miller Road, Ayr	Central and South Ayrshire Milk Recording Society (6 Circuits).
Mr John Lockhart, Stair House, Mauchline	
Mr William Wallace, Lyonstone, Maybole .	
Mr R. H. U. Stevenson, Corseclays, Ballantrae	
Mr M. Semple, Sandhill, Dronagan	
Mr K. N. Russell, Auchincruive, by Ayr . .	Central Ayrshire No. 2 Milk Recording Society.
Mr George Templeton, Carnell Home Farm, Hurlford	
Mr Thomas Pettigrew, Hairmyres Hospital, East Kilbride	Central Scotland Milk Recording Society (5 Circuits).
Mr J. C. Lohoar, Whitlawburn, Cambuslang .	
Mr T. C. Stewart, Southfield, Kirkmuirhill .	
Mr Thos. Johnstone, Standalane, Falkirk .	
Mr M. Bowie, Balmuldy, Maryhill	
Mr W. M'Lachlan, East Crookedstone, Quarter	Dumbartonshire Milk Recording Society
Mr Robert Watt, Milligs Farm, Helensburgh	
Mr M. Sloan, Hunterhouse, Lochmaben	Dumfriesshire Milk Recording Society (4 Circuits).
Mr John Harvey, Nether Keir, Auldgirith	
Mr John Johnstone, Millantae, Lockerbie	East Lothian and Border Milk Recording Society.
Mr David S. Clark, Bellshiel, Duns	
Mr G. W. Lambie, Nether Pratis, Leven . .	Fife Milk Recording Society.
Mr A. Munro, Dell of Inshes, Inverness .	Highland Milk Recording Society.
Mr John T. Kirkwood, B.Sc., N.D.A., Scorrieholm, Lesmahagow	Lesmahagow Milk Recording Society.
Mr John Wallace, Whitehills, Sorbie	Machars Milk Recording Society (2 Circuits).
Mr Robert Laird, Lawthorn, Irvine	North Ayrshire (John Speir) Milk Recording Society (3 Circuits).
Mr J. M. Matthew, Girthill, Saltcoats . .	
Mr Thomas Murdoch, West Tannacrieff, Kilmarnoch	
Mr James A. Stephen, Conglass, Inverurie .	North of Scotland Milk Recording Society (3 Circuits).
Mr Robert Howie, Flatterton, Greenock	Renfrew and Bute Milk Recording Society (2 Circuits).
Mr John Raeside, Hattrick, Kilmalcolm	

Name and Address.	Body Represented.
Mr John Forster, Mains of Larg, New Luce	Rhins of Galloway Milk Recording Society (3 Circuits).
Mr J. M. Gilmour, Chapelton, Borge	"
Mr J. G. Baird, Kirkchrist, Kirkcudbright	"
Mr George Barbour, Auchengibbert, Crockettford	{ Stewartry Milk Recording Society (4 Circuits).
Mr G. Clark, Newmains, Prestonmill	"
Col. W. T. R. Houldsworth, Kirkbride, Maybole	"
Mr A. W. Montgomerie, Westburn, Cambuslang	The Ayrshire Cattle Herd - Book Society of Great Britain and Ireland.
Mr James Howie, Muirside, Dumfries	"
Mr A. B. Fowler, Ph.D., B.Sc., Kirkhill, Ayr	"
Mr Wm. Hodge, Slodahill, Lockerbie	"
Mr James Kilpatrick, Craigie Mains, Kilmarnock	The Highland and Agricultural Society of Scotland.
Captain Ian S. Robertson, Linkwood, Elgin	"
Mr W. J. Kilpatrick, Muirhouse, Kilmarnock	"
Mr Thomas Johnstone, Standalane, Falkirk	{ The British Friesian Cattle Society.
Mr James Dunlop, Midland, Prestwick	"
Mr J. S. Stevenson, Balig, Ballantrae	"
Principal W. G. R. Paterson, 6 Blythwood Square, Glasgow	{ The West of Scotland Agricultural College.
Dr A. M. Smith, 13 George Square, Edinburgh	"
Dr A. Cunningham, 13 George Square, Edinburgh	{ The Edinburgh and East of Scotland College of Agriculture.
Dr J. F. Tocher, 41½ Union Street, Aberdeen	"
Mr John C. Grant, Veterinary Department, Marischal College, Aberdeen	"
Mr Arthur R. Wannop, B.Sc., B.Eng., 41½ Union Street, Aberdeen	{ The North of Scotland College of Agriculture.
Mr John Forster, Mains of Larg, New Luce	"
Mr W. Cassels Jack, Glenpark, Braxfield Road, Lanark	"
Dr Norman C. Wright, M.A., Ph.D., Kirkhill, Ayr	Animal Diseases Research Association.
Dr A. B. Fowler, Ph.D., B.Sc., Kirkhill, Ayr	"
Sir Guy Shaw - Stewart, Ardgowan, Inverkip	{ The Hannah Dairy Research Institute.
Lord Rowallan, Rowallan, Kilmarnock	"
Mr John Speir, 81 Hope Street, Glasgow	"
Mr Alan Barr, Hobsland, Monkton	"
Dr Chalmers Watson, Fenton Barns, Drem	{ Co-opted Members.

Chairman—Col. W. T. R. Houldsworth.

The following were the principal members of the staff :

Superintendent-Secretary—Mr James A. Paterson.

Assistant Superintendent—Mr Percy H. Hart.

SCHEME OF OFFICIAL MILK RECORDS.

ADMINISTRATION.

In 1943, as in previous years, the scheme of Official Milk Records was administered by the Association through local milk recording societies. During the latter part of 1942 and the earlier months of 1943 every effort was made to obtain new members for local societies throughout the various dairying districts of Scotland, and a number of new members were enrolled; but for various reasons, such as members disposing of their dairy herds or removing from their farms, &c., there were a certain number of resignations.

All the local societies which operated in 1942 continued in 1943. The number of recorders' circuits in 1943 was 37. The number of herds officially tested was 868, and the number of cows officially tested 40,476, an increase of 63 herds and 2537 cows from the previous year. The following is a list of the milk recording societies which operated in 1943, with the name and address of the Secretary of each society :—

Name of the Society.	Secretary.
Central and South Ayrshire (6 Circuits)	Mr E. A. Bell, M.A., B.Sc., 2 Miller Road, Ayr.
Central Ayrshire No. 2 .	Mr George F. F. Smith, Union Bank, Kilmarnock.
Central Scotland (5 Circuits)	Mr Arthur Gilhmour, C.A., 23 Silvergrove Street, Glasgow.
Dumbartonshire . . .	Mr Robert Bilsland, 35 Wylie Avenue, Alexandria.
Dumfriesshire (4 Circuits)	Messrs Henderson & Mackay, Solicitors, Lockerbie.
East Lothian and Border .	Messrs Inglis, Orr, & Bruce, 19A Hill Street, Edinburgh.
Fife	Mr F. Dow, Commercial Bank, Thornton, Fife.
Highland	Mr J. M. Hunter, Queensgate, Inverness.
Leamahagow	Mr Thomas MacKail, British Linen Bank, Leamahagow.
Machars (2 Circuits) . .	Mr William Christison, Barglass, Kirkcinner.
North Ayrshire (John Speir) (3 Circuits)	Mr George F. F. Smith, Union Bank, Kilmarnock.
North of Scotland (3 Circuits)	Mr Robert C. May, Advocate, 77 Crown Street, Aberdeen.
Renfrew and Bute (2 Circuits)	Mr Thomas Hunter, Solicitor, 35 High Street, Paisley.
Rhins of Galloway (3 Circuits)	Mr W. Brown Moir, Cairnslea, Stranraer.
Stewartry of Kirkcudbright (4 Circuits)	Mr Patrick Gifford, Solicitor, Castle Douglas.

SEASON 1943.

The following table shows for each society or circuit the number of herds, the number of cows tested, the average interval between tests, and the duration of the recording season :—

Name of the Society or Circuit.	No. of Herds.	No. of Cows Tested.	Average Interval between Tests, in Days.	Duration of Recording Season, in Weeks.
Central and South Ayrshire—				
1. Ayr and Troon	23	845	28	52
2. Coylton and Ochiltree	24	947	28	52
3. Cumnock	25	777	28	52
4. Girvan	24	1183	28	52
5. Kilmarnock	23	930	28	52
6. Maybole	25	1085	28	52
7. Central Ayrshire No. 2	24	993	28	52
Central Scotland—				
8. Carlisle and District	26	882	28	52
9. Dunblane and District	25	1006	28	52
10. Strathaven and District	27	1173	28	52
11. Strathendrick	23	1394	28	52
12. Dumbartonshire	24	848	28	52
Dumfriesshire—				
13. Dumfries—No. 1	21	840	28	52
14. „ No. 2	20	755	28	52
15. „ No. 3	23	927	28	52
16. „ No. 4	22	839	28	52
17. East Lothian and Border	22	1174	28	52
18. Fife	27	1238	28	52
19. Highland	24	789	28	52
20. Lesmahagow	25	958	28	52
21. Muchars - No. I.	22	1207	28	52
22. „ No. II.	23	973	28	52
North Ayrshire (John Speir)—				
23. Fenwick	19	955	25	52
24. 'John Speir'	22	901	28	52
25. Stewarton and Montgomerie	18	857	24	52
North of Scotland—				
26. Aberdeen, Kincardine and Angus	25	1364	28	52
27. Aberdeen, Moray and Banff	26	1659	28	52
28. Aberdeenshire	22	1192	28	52
Renfrew and Bute—				
29. Bute and Kintyre	21	682	28	52
30. Paisley and District	21	791	28	52
Rhins of Galloway—				
31. Kirkcolum and District	27	1385	28	52
32. Kirkmaiden and District	22	1593	28	52
33. Luce Valley	25	1618	28	52
Stewartry of Kirkcudbright—				
34. Dalbeattie and New Abbey	26	1612	28	52
35. Castle Douglas and District	25	1409	28	52
36. Kirkcudbright and District	24	1350	28	52
37. Borge, Twynholm & Gatehouse	23	1345	28	52
Total No.	868	40,476	...	...

DEFINITIONS.

The milk records compiled by the Association are records of the estimated quantity of milk produced by each cow in a separate lactation, and of the estimated percentage of milk fat contained in the milk. For convenience, a gallon of milk is reckoned as 10 lb. A gallon of milk of average quality weighs almost exactly 10½ lb. The following further particulars concerning each record were also given wherever possible :—

Name of cow, byre number, and herd-book number.

Sire of cow and herd-book number of sire.

Dam of cow and herd-book number of dam.

Date of birth.

Date of calving preceding opening of record.

Number of weeks in milk.

Date of calving after record closed.

The following particulars of the preceding records were appended to each record, where available :—

Date of calving preceding opening of record.

Quantity of milk in gallons.

Percentage of fat in milk.

Number of weeks in milk.

The milk yields were estimated in respect of quantity and milk-fat percentage from the results of systematic periodic tests by trained recorders approved by the Association. The recorders visited the farms for this purpose at intervals varying from twenty-one to twenty-eight days, and each day of visit was regarded as the middle day of the period covered by the test. Milk records estimated in this way approximate closely to the actual milk yields.

METHOD OF RECORDING—OFFICIAL RECORDS.

A distinctive feature of milk recording in Scotland in 1943, as in previous years, was that the official records were entirely the work of trained official recorders. Recorders had previously to undergo a special course of training in milk recording at the West of Scotland Agricultural College or other approved College of Agriculture. Only candidates of good character and good general education were selected to attend these courses ; and all recorders before appointment were approved by the Executive Committee of the Association.

All dairy farmers taking advantage of the Association's scheme were arranged into Local Milk Recording Societies employing one or more recorders, the Executive Committee having power to transfer members from one local society to another, in order to find accommodation for new applicants, and at the same time avoid overlapping of recorder's circuits. Each local society applying to the Association for licence to conduct milk recording under the Association's scheme signed the form containing the Association's rules and regulations, and agreed to conform to these rules. The local society selected and appointed their recorder or recorders

from the list of approved recorders obtained from the Association. Apparatus, chemicals, sheets, and books were selected and arranged for by the Association, all byre sheets and record books used by the recorders being supplied free of charge. Thus uniformity of method was, as far as possible, assured.

The official recorder visited each herd at regular intervals of not more than twenty-eight days. He, or she, arrived at the farm in the afternoon, usually by means of a small pony and trap provided by the local society for the purpose, or by motor-car, and was accommodated at the farm overnight. All cows giving milk in each herd, as far as possible, were included in the records. Each cow was clearly distinguished in the byre by a stall number on the wall, immediately in front of and above the level of the cow, and registered animals were also indelibly tattooed on the ears with distinctive registered tattoo markings. The cows were milked in the same rotation, evening and morning, on the occasion of the recorder's visit. The recorder weighed and sampled the milk of each cow in the evening, noting the time at which each cow was milked, and entered the results in the corresponding columns in the byre sheet, taking up a position in the byre as near to the milkers as possible, so as to have them in full view, and, as far as practicable, receiving the milk direct from the milker at the cow's side. He or she again weighed and sampled the milk of each cow in a similar manner in the morning, and entered the results in the byre sheet. He or she then tested the mixed evening and morning proportionate sample for each cow by the Gerber method, for percentage of milk fat. He or she entered in the byre sheet any unusual conditions likely to affect the milk yields. The recorder was required to see that all milk samples and byre sheets were securely locked up overnight or during his absence. From the daily results the recorder calculated and completed the byre sheets, multiplying the yields by the exact number of days which had elapsed since the last test, but so calculating throughout that each day of the visit was regarded as the middle day of the period covered by the test. Special ready-reckoners were used to facilitate calculating and to ensure greater accuracy.

The byre sheets were written out in duplicate. The principal copies were posted at regular intervals to the office of the Association, and the second copies left with the respective members. The recorder transferred the results from the extended byre sheets to the milk record book for the herd indelibly in ink, each cow being assigned a separate page at the top of which full particulars of the cow were entered, including the indelible tattoo marks on the animal.

Visits of inspection were made to each recorder and to the members of local societies at the different farms periodically throughout the year by members of the Association's staff, and reports thereon submitted to the Executive Committee. The Executive Committee reserved the right to withdraw approval of any recorder at any time, or to limit the period of service of any recorder with any particular society. Members of local societies

refusing to observe any of the rules of the Association, or deemed to be guilty of conduct injurious to the true interests of milk recording, were liable to be temporarily or permanently suspended.

During the year a number of surprise tests were made by the Association's staff in order to check the recorder's work. Re-tests of the milk samples already tested by the recorder were also carried out; for this purpose recorders were instructed to retain the milk samples each morning till ten o'clock.

All records were closed at the end of December, the current lactations being carried forward to the new books of the following year. Finally, summary sheets were written out in duplicate showing the total milk yield for each cow for the lactation or part lactation, with full particulars of the cow, dates of calving, &c. The principal copy of the summary sheet was posted to the Association's office with the record book, and the second copy left with the owner of the herd.

All record books and summary sheets were carefully revised, corrected in detail, and initialed in the Association's office during the next few months, the record books being returned later to the respective members, and the summary sheets retained and bound for future reference.

The milk records were next classified into three groups for cows and heifers respectively as undernoted. Experience has confirmed the view that the most useful comparison is obtained by reckoning the yields in terms of pure butter fat. Such a comparison takes into consideration both the quantity and the quality of the milk.

Cows with a milk record equivalent to not less than 280 lb. of butter fat, and heifers with a milk record equivalent to not less than 224 lb. of butter fat, were grouped in Class I. Cows and heifers with milk records of less than two-thirds of these amounts—viz., 186 and 149 lb. of butter fat respectively—were grouped in Class III.

The following short table shows the corresponding values of these yields in fairly good milk of 3.5 per cent milk fat :—

Class	Yield of Butter Fat (Lb)	Corresponding Yield in Milk of 3.5 per cent Fat. (Gallons)
Cows in Class I. .	Not less than 280 .	800
Heifers in Class I. .	Not less than 224 .	640
Cows in Class III. .	Less than 186 . .	531
Heifers in Class III. .	Less than 149 . .	426

All cows and heifers with milk yields falling between these limits would come into Class II. Such animals naturally claim less attention than the good milkers or the obviously unprofitable animals. It should be noted, however, that Class II. would include a certain number of unclassifiable yields, as there were a number of cases where, from various causes, the results of a whole normal lactation could not be obtained.

It should be noted that while the above standards for classification of milk yields are the same as for 1934 onwards, they are higher than those formerly adopted, in the proportion of 280 lb. of butter fat for a Class I. cow to the former standard of 250 lb., the other standards bearing the same relation as formerly to the cow Class I. standard. This decision of the Executive Committee brought the Class I. standard for cows and heifers respectively into line with those adopted since 1924 for the Association's Annual Register of High-yielding cows. This subject was dealt with more fully in the 1934 report under "General Review."

It should always be kept in mind when making a comparison of cows in different herds or in different districts that the different methods of dairying practised have a considerable influence on the milk yields, and that therefore milk yields alone do not necessarily indicate the true relative inherent or hereditary milking qualities of the animal, but the authenticated milk records compiled by the Association are of inestimable value to breeders and owners of dairy cows if properly interpreted.

GENERAL REVIEW.

Notwithstanding difficulties in regard to labour, equipment, and alcohol and acid, milk recording in Scotland was carried on in 1943, and it was possible to maintain the system of control which has always been a feature of the Scottish Scheme. The number of cows tested in 1943 was 40,476, an increase of 2536 over that of 1942. The recording work was carried out mainly by women recorders, who prior to appointment received a special course of instruction at the West of Scotland Agricultural College, Auchincruive.

The year 1944 gives indication of being a record year in the history of the Association. In the latter part of 1943 many applications were received from dairy farmers to have their herds milk recorded, and this demand has been continued. It has not been possible, as yet, to accommodate all the applicants, but arrangements are in hand for the formation of additional circuits. Since the beginning of 1944 new circuits have been formed in the following societies :—

Central and South Ayrshire ;
Central Scotland ;
East Lothian and Border ;
Fife ;
North of Scotland ;
Rhins of Galloway ;
Stewartry of Kirkcudbright ;

and a new society with one circuit has been formed in Arran. As at 30th April, 45 recorders' circuits were in operation, and the number of herds recorded was 1034 as against 868 in 1943. This is the greatest number of herds ever recorded at one time by the Association, and this number will be considerably increased before the end of the year.

ANALYSES FOR MEMBERS DURING 1943.

By Dr J. F. TOCHER, Aberdeen, Analyst to the Society.

THE following is an account of the results of analyses of samples sent in by members during 1943 :—

FERTILISERS.

The fertilisers examined during the season included nine compound manures, five superphosphates, six ground limes and lime-stones, and several miscellaneous fertilisers. The following table (Table I.) gives the results of analyses of the compound fertilisers :—

TABLE I.

	Nitrogen.	Soluble phosphoric acid.	Insoluble phosphoric acid.	Potash.
Potato manure	7.70	7.65	1.10	7.63
Potato manure	5.36	9.60	0.60	10.42
Potato manure	4.76	9.97	0.64	8.30
N.P.K. manure	6.88	7.50	0.40	8.85
Turnip manure	1.43	4.42	12.84	..
Turnip and swede manure	4.83	11.57	4.46	..
Grain manure	6.58	11.52	0.88	..
Grain manure	4.10	12.29	0.76	..
Manure	3.42	12.52	2.00	..

The proportion of potash in the potato manures varied from 7.63 to 10.42 per cent. A proportion of potash as high as 10.42 per cent is seldom found in potato fertilisers. The two samples of turnip manure contained insoluble phosphoric acid to the extent of 4.46 and 12.84 per cent. In the other samples of mixed fertiliser the insoluble phosphoric acid present was that from the superphosphate.

Three of the samples of superphosphate were in close accordance with the guarantee of 18 per cent soluble phosphoric acid. The proportions of moisture varied from 10.5 to 13.1 per cent. One sample contained only 16.3 per cent of soluble phosphoric acid. A sample of American superphosphate contained 42.2 per cent of water soluble phosphoric acid. This fertiliser may be prepared from phosphate rock and phosphoric acid.

A sample of horn, hoof, and bone meal contained 8.3 per cent of nitrogen and 10.3 per cent of insoluble phosphoric acid, while

a sample of *antler* dust contained less nitrogen and more phosphoric acid—5.64 per cent and 20 per cent respectively being present.

Four samples of limestone contained from 86.8 to 97.6 per cent of calcium carbonate. A sample of ground lime contained 61.4 per cent of caustic lime. The waste lime examined was found to contain 57.6 per cent of calcium carbonate. This is approximately two-thirds of the proportion present in good quality limestone. A special fertiliser contained 47.9 per cent of sand. Five per cent of insoluble phosphoric acid was present with 8.5 per cent of potash. The value of this material, according to the Society's units, was approximately £2, 19s, per ton.

The results of analysis of a manure containing straw were found to be comparable with those obtained from farmyard manure. Two samples of flue dust were found to have no fertilising value. Only 0.3 per cent of nitrogen was present, with slight traces of phosphate and potash. An organic fertiliser was found to contain 20.3 per cent of nitrogen.

FEEDING-STUFFS.

The samples of feeding-stuffs analysed comprised samples of meat and bone meal and dairy and poultry meals. The meat and bone meals contained from 11 to 17 per cent of oil, from 50.6 to 57.8 per cent of albuminoids, and from 6.8 to 8.1 per cent of phosphoric acid.

One of the samples of dairy meal analysed contained less oil than the prescribed minimum, only 1 per cent of oil being present, but the proportions of albuminoids and fibre were normal. Another sample of dairy meal contained a proportion of albuminoids very slightly beyond the maximum prescribed by the Compound and Mixed Feeding Stuffs (No. 2) Order as amended. A sample of National poultry food 1A (laying meal) also contained a proportion of albuminoids beyond the prescribed maximum of 19 per cent. A sample labelled 'Fish Meal' was found to consist of coffee residues.

The Statutory Rules and Orders referring to cattle, horse, pig, and poultry foods give detailed regulations regarding the nature and composition of ingredients, and specify the conditions for the proportions of oil, albuminoids, and fibre in the prepared feeding-stuffs. In all cases the proportion of fibre is a maximum, while that of albuminoids is given as minima and maxima. Poultry foods have a minimum of 3 per cent for oil; pig foods have a maximum of 4 per cent. These war-time regulations do not invalidate the limits of variation applied to guarantees given under the Fertilisers and Feeding Stuffs Act.

The following table (Table II.) gives the results of analysis of the various feeding-stuffs received :—

TABLE II.

		Oil.	Albu- minoids.	Phos. acid.			
Meat and bone meal .	.	11.10	57.75	8.14			
Meat and bone meal .	.	17.13	50.56	6.76			
Meat and bone meal .	.	15.04	57.06	7.16			
					Soluble carbo- hydrates.	Fibre.	Ash.
No. 1A laying mash .	.	3.70	25.62	..	6.73	..	..
No. 1A layers' mash	.	3.21	20.92	..	8.52	..	..
Dairy meal		1.00	23.47	44.86	8.67	7.61	14.39
Dairy ration		5.40	25.90	43.59	6.90	6.02	12.19
'Fish meal'		7.27	14.56	45.54	14.70	12.70	5.23

MILKS.

Of the samples of milk analysed, one was found to be below the presumptive limit of 3 per cent in milk fat, while one was below the presumptive limit of 8.5 per cent in solids-not-fat.

The following table (Table III.) gives the results of analysis of the samples received. Thirteen of the samples were analysed for milk fat percentage only.

TABLE III.

No.	Fat, per cent.	Solids-not-fat, per cent.	No.	Fat, per cent.	Solids-not-fat, per cent.
1	2.70	9.35	11	3.90	
2	3.05	9.04	12	4.40	
3	3.40	9.33	13	6.80	
4	4.10	8.35	14	4.25	
5	4.70	8.85	15	4.30	
6	3.85	8.75	16	3.35	
7	4.57	8.69	17	4.80	
8	4.52	..	18	4.35	
9	4.20	..	19	4.90	
10	4.50	..	20	4.05	

The proportion of milk fat varied from 2.70 to 6.80 per cent, the average being 4.23 per cent. Fourteen of the samples contained over 4 per cent of fat. The proportion of solids-not-fat varied from 8.35 to 9.35 per cent, the average being 8.91 per cent.

WATERS.

Four of the twenty-nine samples of water received were found to be unfit for domestic use. One sample contained one part per million of dissolved lead, while another was of poor quality owing

to the presence of nitrite. This, often in conjunction with increased amounts of free and albuminoid ammonia, usually indicates the access of surface or drainage water which can, in most cases, be prevented by attending to the well. In connection with some of the samples, advice was given about suitable piping and treatment of cisterns.

POISONS.

Several examinations of feeding-stuffs and of stomach contents were made in trying to determine the cause of illness or death of various kinds of stock.

Lead was found to be present in the stomach contents of a stirk in sufficient amount to have caused death. Arsenic was responsible for the deaths of three cows. A sample of sheep dip examined in connection with this case was found to contain arsenic to the extent of 52 grains per gallon. The stomach contents of a dog contained traces of bismuth from medicine administered, but no poison was detected. Bismuth is frequently used as a medicament. The active ingredient in a sample of rat poison was found to be red squill. This material is largely used because it is stated to be harmless to domestic animals in the proportions required for rat baits.

I should again like to point out to members that in cases involving a search for poisons, adequate amounts of stomach contents, &c., should be sent for analysis.

POST-WAR AGRICULTURE.

MEMORANDUM BY THE BOARD OF DIRECTORS.

NATIONAL VIEWPOINT.

THE land of our country is a precious national heritage. The object of any post-war agricultural policy must be to see that the land is used in the best interests of the nation, and handed on in a state of unimpaired fertility to succeeding generations.

In order to secure this it is essential that the three parties directly interested, the landowner, the farmer, and the farm worker, should receive an adequate return for their capital, skill, and labour. In the past, agriculture has been the victim of our industrial exports and imports. It has been sacrificed for the sake of securing markets for our industrial products abroad. No assured return has been forthcoming for the products of the soil to enable it to be cultivated efficiently.

Stable conditions are essential in order to prevent the industry from sinking into the state into which it has so often fallen in the past. Agriculture must be regarded as one of the essential defence services. It must be recognised that it is in the national interest that agriculture should be safeguarded and placed on a footing which will maintain it in a state of reasonable prosperity.

The numbers engaged in agriculture and its dependent trades during the years preceding the war were far in excess of the numbers engaged in any other single industry. With agriculture restored to a state of prosperity, an incentive would be provided for the development of rural trades and crafts associated with agriculture, and a consequent increase in the rural population could be looked for. Increased prosperity in agriculture and consequent greater purchasing power on the part of those engaged in it, together with an expanded rural population, would render effective support to other industries by providing a valuable home market.

The notes which follow have been prepared as a result of consideration of conditions in Scotland, but the broad principles indicated would apply to the whole country.

The Directors have not considered it necessary to go into elaborate details or to review the past history of agriculture, but merely to state broadly what they deem to be the essentials to keep the industry on a sound basis.

ESSENTIALS FOR POST-WAR AGRICULTURE.

The Directors anticipate that the present Ministry of Food will be continued for a time after the cessation of hostilities, and they are of opinion that it is during that period that a future policy for agriculture should be framed and passed into legislation.

For real stability and prosperity in agriculture after the war there must be a long-term policy. With this end in view there appear to the Directors to be five main essentials, as follows :—

- I. Effective regulation of food imports.
- II. Control of prices to producers.
- III. Regulation of home production and efficiency in the industry.
- IV. Capital for re-equipment.
- V. Improved conditions for those working on the land.

I. EFFECTIVE REGULATION OF IMPORTS.

It is suggested that there be Machinery (possibly a Ministry) to control the purchase and sale and distribution of all imports of food-stuffs for man and live stock.

II. CONTROL OF PRICES.

The Controlling Authority referred to would regulate and control the prices of home-produced food-stuffs in relation to costs of production. Further, there should be a thorough investigation into the costs of distribution of all food-stuffs.

III. REGULATION OF HOME PRODUCTION AND EFFICIENCY IN THE INDUSTRY.

It is recommended that the Regulating Authority for Agriculture should be the Secretary of State, through County Agricultural Committees.

A complete production survey of all agricultural land for crop and stock would require to be made. This would form the basis upon which to calculate the food production from our own soil, and would regulate the standard of home production and the imports required.

County Agricultural Committees.—It is recommended that powers presently vested in County Councils relating to the formation of holdings or other matters connected with agriculture . . .

be abolished. This would not apply to matters of Public Health, except as hereinafter referred to.

There should be set up in each county or district a County Agricultural Committee, or Committees, consisting of from eight to ten members, appointed by the Secretary of State. The appointments to the Committee would be during the pleasure of the Secretary of State. Vacancies would be filled by the Secretary of State. There should be included in the membership of such Committees representation of landowners (including occupying owners), tenants, and farm workers. Each Committee would have a Secretary and an Executive Officer.

The duties of the Committee would broadly be :—

(1) General supervision of the plans of crop and stock and of the standard of farming in the county or area.

(2) General supervision of the equipment of the buildings, fences, drainage, &c., with power to order re-equipment.

(3) Consultative in all matters relating to the use of land for smallholdings and for the diversion of land from agriculture to forestry, building sites, or other non-agricultural purposes, and consultative with County Councils regarding alterations or additions to existing buildings or new farm buildings.

The duty of the Committee should be to see that the best use is made of the land, keeping in view varying conditions and types of soil. Affected parties would have right of appeal to a Tribunal set up by the Secretary of State in respect of any order served on them by the Committee.

IV. CAPITAL FOR RE-EQUIPMENT.

Much capital will be required in any scheme of post-war agriculture, and the Directors have considered the matter under the following heads :—

(1) *Soil*.—The war production plans have been made possible largely by the use of the stored manurial capital in the soil. Some restoration has been made by the application of lime and artificial manures, but much capital will be required to restore the soil to a condition for a completely balanced agriculture.

Soil analysis made before, but particularly during the war, has revealed a considerable shortage in the lime requirements of the soil, and every endeavour must be made to open up and develop sources of supply, particularly in the remoter parts of the country.

(2) *Buildings, &c.*—Many workers' houses require to be rebuilt or drastically overhauled; dwelling-houses on smaller farms and crofts leave much to be desired as homes, and many farm steadings require to be repaired or remodelled or added to in order to make them suitable to house and feed stock under conditions which our

most recent knowledge demands, and in order that crops and the large range of modern implements may be properly housed. Fencing and draining constantly require considerable capital outlay.

(3) *Ownership*.—After the fullest consideration, the Directors do not favour nationalisation of the land. They are satisfied that in the present varied class of ownership and tenancy there is a foundation upon which to build a prosperous post-war agriculture.

Should an owner or owner-occupier be unable to equip or re-equip his land as required by the County Agricultural Committee, or as determined by the Appeal Tribunal, then the property would be sold under a State guarantee. The property would be valued by a qualified valuator and put up for sale in the open market, and, failing a private purchaser at or above the valuation, the land would be purchased by the State at the valuation fixed.

The Directors recommend that for existing tenancies, where considerable re-equipment is required and one of the parties wishes a readjustment of the present rent, failing agreement, arbitration should be carried out in the usual way and a rent adjusted for the farm as equipped at the date of legislation.

In the event of the County Agricultural Committee ordering re-equipment, the tenant would pay such additional rent for the re-equipment as might be arranged, and, failing agreement, as might be fixed by arbitration.

County Agricultural Committees would have powers to order upkeep. All cases of dispute as to upkeep between owner and tenant should be subject to the decision of the County Agricultural Committee, with right of appeal to the Tribunal previously referred to.

The Directors recommend that all costs of re-equipping buildings, where ordered or sanctioned by the County Committee, should rank as cost of upkeep and should be allowed in the Maintenance Claim.

(4) *Heather Burning and Hill Land Improvement*.—County Agricultural Committees would have power to order heather burning and other means for the improvement of hill grazings. In all cases of dispute as to the areas to be burned, the matter would be referred to the County Agricultural Committee, whose finding would be final and binding between owner and tenant.

(5) *Bracken*.—Bracken could not be tackled under a depressed agriculture such as existed pre-war, and the Directors are of opinion that many areas of infested bracken land can now be treated only as a national matter.

V. IMPROVED CONDITIONS FOR THOSE WORKING ON THE LAND.

(1) *Wages*.—These naturally form a first charge on the profits of a prosperous agriculture, and would be adjusted by a National

Wages Board in liaison with the suggested Controlling Authority for imports and prices.

(2) *Housing*.—As wages form a first charge on the profits of the industry, so the first capital charge must essentially be for the provision of modern dwellings, in suitable environment, for all land workers. Much has been done in the past twenty years to improve workers' houses, but much of such improvement is now out of date. Many houses reconditioned should have been demolished and new houses erected on other and better sites, but the terms of the grants for reconditioning precluded this being done.

The main difficulties in the provision of rural housing are the lack in many counties of regional water supplies, drainage, and electric light and power. Drainage is not an insurmountable difficulty in rural areas, but water, lighting and power are essentials, and must be provided if we are to retain the workers on the land. The supply of water should be designed on a national basis.

The 'tied' house is the class of dwelling favoured by farmers in Scotland as being the best from a management point of view, but under the guarantees envisaged convenience must be sacrificed to what is in the best interests of the workers and of the State. Houses for 'key' workers must of necessity be situated near the farm buildings, and should be provided by the owner of the land as part of the standing equipment. General workers might have their dwellings centred in groups or villages, at points suitable to a number of farms. Such centres would not be possible for sheep farms, and the houses on these must inevitably remain 'tied' and on the farms, but should be situated at suitable points, and with good access roads. A development of the suggested grouping of houses would be a centre for smallholdings, rural craftsmen, such as blacksmith-agricultural engineers, and other tradesmen, and centres of transport. Such villages would make for economy in the provision of water supplies and other services. Transport of workers might seem a difficulty, but when an industry is prosperous such difficulties can be overcome. The provision of these houses would be a matter for the State.

Where existing farm cottages provided by the proprietors conform to Public Health requirements, these would remain 'tied' cottages, and would continue so, so long as they complied with these requirements, or were made to do so.

Provision would require to be made at all such centres of population for ample facilities for social life, and for meeting-places for Women's Rural Institutes and other similar organisations.

LONG-TERM POLICY.

The Directors view with some concern the suggested four years' plan for agriculture. They are satisfied that, unless the industry can look forward to a guaranteed policy over a lengthened period,

no capital will be forthcoming to equip the land. Given a long-term policy, it is anticipated that the industry will be able to finance the equipment by loans on easy terms from the State or otherwise. Capital so used to be repaid in capital and interest over a period not exceeding twenty years.

GENERAL OBSERVATIONS.

Fat Stock.—Of the pre-war output from Scottish farms, live stock and their products represented approximately 75 per cent of the total, and unless this essential fact is kept in view by those aiming at the production of protective as against energy foods, the results are more likely to be harmful than helpful.

The interdependence between one area or class of farming and another is finely balanced, and only now, with increased cropping in the arable areas, is the necessary dependence returning.

It is suggested, therefore, that, subject to some adjustment in detail, the existing control of the meat industry be continued, as anything short of complete control cannot but fail in its intention.

There is a definite need of greater facilities for cold storage to carry over during peak marketing periods, while accommodation for hanging carcasses a sufficient time would overcome a handicap the home product has suffered under for many years.

With, in most cases, greatly lessened costs of production, imported meat can be sold at a price to allow sufficient margin to level up prices of the home product.

It is recognised that control by itself will not completely effect the ensuring of an adequate demand in competition with the high-grade imported meat. Every encouragement, therefore, must be given, and every effort made by those in the industry to concentrate upon the production of a super grade that cannot be equalled by overseas supplies.

Store Stock.—Under a guaranteed market for finished products, a large proportion of our beef and mutton requirements would be met by stock reared in this country, and ample provision must be made for this in framing a balanced agriculture. Under such a guarantee, there would be scope and encouragement for the up-grading of our stock, and our marginal and hill land would become a valuable source of supply for our store markets.

Co-operation.—The Directors visualise the setting up of area co-operation amongst farmers for the purchase of manures, feeding-stuffs, and other requirements, and for transport.

Transport.—To bring the Highlands and Islands into a favourable position to share in any post-war prosperity in agriculture, a uniform system of transport charges is recommended on the lines of the postal system.

Education.—Brief reference has been made to the possibilities for allied trades and rural interests through a revived agriculture. That also, by affording good wages and better prospects, would go some way to solve the social evil of the pre-war drift by rural workers to populated centres, causing depletion on the one hand and unemployment on the other.

Initiative alone will not bring about the required change. The realisation of the benefits of healthful and steady employment under improved conditions will at first require to be instilled into our youth during the closing years of their school life by careful training for individual and social life. The proposed extension of school age affords an opportunity, that is, if a complete readjustment of the curriculum as it affects pupils from 12 years of age be adopted. Pupils from 12 to 14 years presently attending a rural primary school are merely marking and wasting time, and unless some outlet is to be provided for the pupil's activities in mind and body, there is no justification for an extension of the school period.

We recommend, therefore, that pupils, on reaching the age of 11 + years, and who are not preparing for a secondary education, should attend a centralised county school—preferably residential—affording, apart from general education, facilities for elementary science and practical training for boys, and domestic science for girls, according to the pupil's needs and bent. Isolated instances on such lines are already being tried out, with the view that the future generation may prove better citizens and more skilled and contented rural workers.

On reaching the school leaving age, with the possible exception of the more thinly populated areas, rural pupils can readily find employment in agriculture, while the introduction of compulsory part-time Continuation Classes will afford an opportunity for technical training, planned in relation to the vocation the pupil intends to follow. Such a departure from the traditional scheme of elementary school curriculum, in fact, implies a profound change in the scope and method of rural teaching, and to meet the situation it will be necessary to envisage in a definite manner the nature of the work which will fall to rural teachers and to make provision for their training. This implies a major development in the existing facilities provided by the Agricultural Colleges. Already expansion in college work has taken place through the greater demands made upon the industry, following on which an increase in the numbers of students may be anticipated, requiring additional staff, and entirely new and larger premises will require to be provided if the work is to be satisfactorily dealt with.

Throughout the history of our three Colleges finance has been, for the most part, a difficult question. The principle that Government grants are conditional on adequate support from Local Authorities is in theory admirable. In practice, while Local Authorities are generally very much alive to getting full value for their contribution, their interest in the work, if measured by the amount of their contribution, must, in too many instances, be slight. The financial stringency from which the Colleges normally

suffer handicaps progress, while the staffs' scale of salaries offers no immediate or future inducement for the best students to accept appointments.

The Directors are strongly of opinion that there must be a complete survey of the whole field of Agricultural Education, and that our Agricultural and Veterinary Colleges and Research Institutes must be housed, equipped, and staffed so that there be no impediment to the work of education, research, and trial.

Animal Diseases.—The farm live stocks of our country are the best in the world, and steps must be taken to eliminate disease of all stock, and, in particular, tuberculosis, mastitis, and contagious abortion. Notification of these diseases should be compulsory, and no animal suffering from them should be offered for public sale. All imported breeding stock should be certified free from disease on arrival in this country.

8 EGLINTON CRESCENT,
EDINBURGH 12, 3rd November 1943.

DEMONSTRATION AND EXHIBITION OF NEW IMPLEMENTS.

CASTLETON, EASSIE, ANGUS, APRIL 1944.

IN November 1943 the Directors had before them a proposal that the Society hold two Demonstrations of the latest implements in 1944—one in the early summer and the other in the autumn. The proposal was remitted to the Implements Committee for consideration, and, if so decided, to make the necessary arrangements.

The Implements Committee, after due consideration, made the following recommendations: that there be (1) a Demonstration in April which would include Potato Planters, Potato Coverers, Row-Crop Implements, and Transplanters; and (2) a Demonstration in the late summer or early autumn, which would include Combine Harvesters, anything new in Binders, Beet-Lifters, and Potato Harvesting Machines. It was suggested that the spring Demonstration be held in the County of Perth or the County of Angus, and the autumn Demonstration in the Lothians. Each Demonstration would last for two days, and, at the same time, there would be on Exhibition other new and improved implements which it might not be possible to show in actual operation.

These proposals were approved by the Directors on 5th January 1944, and, on the recommendation of the Implements Committee, it was remitted to the following Sub-Committee to carry out the arrangements: Sir Joshua Ross-Taylor, *Convener*, Major R. F. Brebner, C.B.E., Mr James Paton, Mr Thomas Hutchison, Mr W. D. Simpson, and Mr Finlay MacGillivray. Mr T. A. Wedderspoon was later co-opted as a member of the Committee.

An excellent site for the Demonstration of Implements designed for spring work was placed at the disposal of the Society through the courtesy of Mr Thomas A. Wedderspoon, Castleton, Eassie, Angus. Mr Wedderspoon very kindly placed at the disposal of the Society fifty acres of plough-land for demonstration purposes, and a large grass field for exhibition purposes and for use as a car park. Rules and Regulations were drawn up and entries invited by advertisement in the Press. A large and representative entry was received. The date of the Demonstration was fixed for 19th and 20th April.

Mr C. Davies of the Machinery Division of the Ministry of Agriculture was, on the invitation of the Committee, released by the Ministry in order that he might undertake the technical

supervision of the Demonstration and furnish a report thereon. The Department of Agriculture and the three Agricultural Colleges in Scotland kindly agreed to the services of their Machinery Instructors being made available to assist Mr Davies in the work of supervision.

Through the courtesy of the Lord Provost and Council of Dundee, arrangements were made with British Restaurants, Dundee, to provide snack luncheons and teas on the ground. These facilities were highly appreciated by the large number of visitors who were present at the Demonstration.

Lady Cayzer, Deputy President of the Angus Branch of the British Red Cross Society, kindly undertook to arrange for a collection to be taken by V.A.D.'s in aid of the Scottish Red Cross Agriculture Fund, and a sum of £221, 0s. 3d. was raised.

The weather on the first day of the Demonstration was unfortunately wet, and only a few of the machines could be seen in operation. On the second day, however, the weather improved, and practically all the machines were seen at work. The Society desires to express its appreciation of the public-spirited manner in which manufacturers responded to the invitation to enter implements. The attendance of the public was estimated at 5000 on each day, or 10,000 in all.

Mr Wedderspoon not only placed his fields at the disposal of the Society, but also the use of his farm buildings and implements, and the services of his staff. The details of the local arrangements were almost entirely in his hands, and he was indefatigable in his efforts to promote the success of the Demonstration. The cordial thanks of the Society are due to Mr Wedderspoon for his most valuable services.

Mr C. Davies carried out his duties as Technical Supervisor of the Demonstration with tact and efficiency, and the thanks of the Society are due to him, not only for the manner in which he discharged these duties, but also for his interesting and informative report on the Demonstration.

REPORT BY TECHNICAL SUPERVISOR.

Mr C. DAVIES, Technical Adviser on Agricultural Machinery,
Ministry of Agriculture and Fisheries.

THE Demonstration was in some respects unique, being one of the first, if not actually the only comprehensive demonstration of toolbars and other tractor-mounted equipment under field conditions to be held in Britain. Many difficulties had to be contended with. These were mainly due to war-time transport restrictions, and they affected not only the exhibitors, but also the many thousands of keenly interested farmers who were present on both days. Nevertheless, the Society is to be congratulated on getting

together such an array of row-crop equipment, in laying out the demonstration in such a way that each tool and machine could be examined and appraised without that crowding which is so common at similar gatherings, and in bringing to the notice of progressive farmers and their workers new and improved appliances for speeding up work and cutting down costs of production. The educational value of the demonstration was great.

Space does not permit of a full description of each machine and tool, but brief comments are made under these headings:—

Toolbars and Similar Equipment.
Row-Crop Machines and Appliances.
Other Machinery Demonstrated.
Machinery on Exhibition.

Toolbars.—From the demonstrator's point of view the conditions, apart from the wet weather on the first day, were excellent, the fields being level, the plots of sufficient length to obviate too frequent turns, and the soil a very light, free-working sandy loam, almost free from stones.

So far as ridging bodies are concerned, it is clear that whilst most makers have satisfactorily solved the problem of mounting such bodies on tractors, they have not all perfected these fittings. They are still experimenting with the splitting back or covering of potatoes. There is no doubt that this operation of splitting requires a well-designed and carefully set tool, together with a high degree of skill on the tractor-driver's part. This work is even more difficult on some sloping land, but the demonstrators lacked the conditions to display their prowess and their implement's ability to treat such fields.

David Brown Tractors Ltd., Meltham, near Huddersfield, Yorks., and *Macneill Tractors Ltd.*, St Peter's Lane, Glasgow, C.2.—These two firms jointly showed David Brown tractors fitted with row-crop rear wheels, power lift, ridge-riding fronts, and row-crop cultivating tools. The tractors and the implements attached all did good work. The 3-row ridger fitted with Macneill Patent Clutch Release made a neat job, although to some tastes the ridges might have been a bit deeper. The quality of the splitting was fair.

Denning & Co. (1937) Ltd., Crimchard Works, Chard, Somerset, demonstrated an implement built on the lines of the 'Oxford' toolbar. This is a neat and workmanlike tool in which some recently introduced improvements have been incorporated, mainly in the lifting mechanism. Careful driving was necessary when covering to keep the front wheels of the Fordson on top of the ridges.

Ford Motor Co. Ltd. (Harry Ferguson Incorporated), Dagenham, Essex.—This firm showed a range of Ford-Ferguson implements, all of which were examined with interest. The method of attach-

ment to the tractor and the very effective hydraulic lift for these tools appealed to many discriminating farmers. The equipment demonstrated put up good performances.

The sugar beet cultivator, with its second seat on the tractor and what appeared to be a very sensitive steerage lever, was unfortunately not shown working, but it will probably prove to be a very useful addition to the range of steerage hoes for other crops as well as beets.

Implo Ltd., 83 Hutcheson Street, Glasgow, C.1.—Although this firm showed a toolbar, their main contribution was a hydraulic lift for Fordson tractor. This easily attached device with suitably designed or adapted ploughs and other implements, such as the toolbar, which they demonstrated, gives the Fordson many of the advantages possessed by tractors initially designed with such lifts.

International Harvester Co. of Gt. Britain Ltd., 259 City Road, E.C.1.—The Farmall 'H' Row-Crop tractor equipped with lift-all attachment was demonstrated with the firm's toolbar, equipped with tines or ridgers as required. Although light in appearance, and it is unwise to judge by that standard in these days of high-duty steels, the tool acquitted itself well, making the ridges and then cultivating between them.

L.O. Tractors Ltd., Coupar-Angus, Perthshire, have given a good deal of thought to the splitting of ridges, and their front coverer gave an impressive display, and it might be on these lines that covering tools will develop.

Their rear mounted toolbar did very good work.

Another interesting entry was a 3-row ridger fitted with a distributor for depositing fertilisers in the furrows before setting the seeds. This combined machine is a very useful contribution to the large growers' needs, but the power of the tractor used was undoubtedly more than was required for the work done.

James Mackintosh, Angus Engineer Works, North Street, Forfar, Angus.—These makers demonstrated a power-lift toolbar designed for attachment to a Massey-Harris 101 Junior Tractor, and this toolbar has a novel and useful feature—a telescopic guide—to circumvent interference with the vertical lift. The outfit behaved well in ridging and cultivating, but when splitting back the quality of the work was not good, due either to inexperience on the part of the driver or insufficient pneumatic wheel grip.

A. T. Mungall Ltd., 167-169 Castle Street, Forfar.—The Parra-frame Hand Lift, back-mounted toolbar for Fordsons functioned satisfactorily, but appeared to require an appreciable effort to raise it on the headlands.

Ransomes, Sims & Jefferies Ltd., Orwell Works, Ipswich, Suffolk,

entered the following excellent collection of toolbars and cultivators :—

Front Toolbar Frame C.50, for IHC Model “ M ” Tractor.

Rear Toolbar Frame C.46, for IHC Model “ M ” Tractor.

Front Toolbar Frame C.52, for Case Model DC3.

Rear Toolbar Frame C.24D, for Case Model DC3.

Rear Toolbar Frame C.36B, for Fordson Standard 4-wheel Tractor.

Rear Toolbar Frame C.37A or C.38A, for John Deere Model “ A ” or “ B ” Tractor.

Tractor Cultivator, for Row Crop Work—Dauntless No. 13B or No. 14B.

Subsoiler C.1C.

The work done in every case was of a high order when ridging and cultivating, but all the covering was not of the same quality.

The combined front and rear toolbar frames for ridge-making is an innovation, and might appeal to some farmers.

The Subsoiler is an implement capable of pan-breaking and very deep subsoil stirring, an operation which undoubtedly improves the yielding capacity of some fields.

Alexander Scott, Agricultural Engineer, North Broomage, Larbert.—The toolbar entered by this firm for attachment to a Fordson can be fitted with cultivating tines or ridging bodies. The latter are provided with spring-loaded buckles to act as safety releases on stony land, but the nature of the demonstration field did not enable these to be seen in action. The implement behaved satisfactorily.

Peter Small, 15 Queen Street, Forfar.—This firm showed a cultivating attachment designed for power lift Farmall “ H ” and “ M ” tractors, and the work done was very creditable.

John Wallace & Sons Ltd., 34 Paton Street, Dennistoun, Glasgow, E.1, had two implements operating in the field, both fitted to Oliver “ 70 ” tractors. The rear toolbar, working on what might be called orthodox lines, did a very good job of work in ridge-making.

The front toolbar, perhaps more accurately described as side mounted, has not been seen as much over here as rear mounted. With certain makes of tractors, and the Row Crop Oliver is one of these, this arrangement certainly has a number of advantages, the visibility of the work in hand being not the least of these, which is important when covering potatoes and also for inter-row cultivation.

Little has been said about the tractors to which these various implements were attached, mainly because the demonstration was

to enable the tools to show their paces, but it must be remembered that for row-crop work a tractor with adjustable wheel tracks and with ample clearance is generally desirable. This does not, however, rule out a fixed track machine, providing the farmer is prepared to adapt his row widths to the tractor he has. We might at times be too conservative in our ideas about the distance apart some of our crops should be.

Also it should be borne in mind when witnessing demonstrations such as this, and in comparing machines, that a good operator can often make a poor implement put up an impressive performance, whereas an inexperienced demonstrator might let down a well-designed and excellently made tool by inexpert handling.

Ridge splitting can always be accomplished more satisfactorily, especially if a 4-wheel tractor is used, when the first ridges are made with good flat tops. The covered potatoes can be left with a nicely crested ridge if this is desired, but to attempt to steer a tractor on top of sharp crests is asking too much of driver, tractor, and ridging bodies.

ROWCROP MACHINES.

Two Potato Planters were seen at work. The "Teagle," made by *Denning & Co.* (Somerset), is a reasonably successful attempt to eliminate all hand-placing of the tubers in the feed mechanism. Two sets of chains and cups lift the seed from a suitable hopper and carry it through spouts, depositing it in the furrows made by small ridging bodies. The operator who rides on the machine is mainly occupied in filling gaps in the conveyor or removing doubles. Fertiliser is applied by a separate mechanism, and a simple device ensures that there is a light sprinkling of soil between the seed and the fertiliser. This 2-row planter did good work, and is greatly improved in design and performance since it first appeared a couple of years ago.

The other Potato Planter, the Robot, entered by *Transplanters (Robot) Ltd.*, Sandridge, near St Albans, Herts., was also a 2-row machine equipped with a fertiliser attachment. This planter is designed for hand-feeding, the operators sitting fore and aft within comfortable reach of the hopper, through which a supply of seed passes by gravity.

Both of these Potato Planters were equipped with furrow openers and efficient coverers. This eliminates the opening and subsequent splitting back of ridges and furrows. There was much discussion about the relative merits of these two methods of planting the crop. There is little experimental evidence showing that one is superior to the other as far as yields go, but it is certain that a machine which can go into a well-tilled field and, in one operation, open furrows, deposit seed and fertiliser, and cover with adequate ridges, has undoubted advantages from the speed and costs point of view.

Transplanters (Robot) Ltd. also demonstrated the Robot Transplanter, a machine of great ingenuity, but nevertheless of sound construction, and one which has passed through trials and developments over a period of ten years or so and emerged as a valuable labour-saver for the market gardener. This transplanter gave an impressive display, albeit on a limited scale.

Ransomes, Sims & Jefferies' baby tracklayer Motor Cultivator with plough, disc, and toolbar is a very handy little outfit for the small market gardener and grower. It is remarkable how such a small air-cooled engine, when disposed on a carefully thought-out chassis and carried on tracks, can do so much really useful work.

A similar power unit is used by *Shillan's Engineering Co. Ltd.*, Britannia Works, Crouch Street, Banbury, Oxon., in their B.M.B. Plowmate Two-wheeled Tractor, which is capable of pulling a normal-size single furrow plough. A full range of cultivating tools, including a disc harrow, was shown. Although the driver has to walk behind this small tractor, the work it does is good.

OTHER MACHINERY DEMONSTRATED.

"*Thwaites*" *Manure Loader*, shown by L. Basil Thwaites, Welsh Road Works, Cubbington, Leamington Spa, created a great deal of interest. Attached to and driven by a Fordson Tractor, this machine made a neat job of loading dung, from a covered court, into two manure-spreaders. The general consensus of opinion was that this clever invention removed much of the toil of dung handling, even if it did not actually reduce the number of men required for the operation. It seemed, however, that this machine did the job with greater despatch than human muscles and forks, so it is a time-saver. There is no doubt that further improvements will make of this a really worth-while machine for many who have to handle appreciable quantities of dung.

The John Deere Farmyard Manure Spreader, recently imported, gave an impressive display in shredding and evenly scattering manure in the field. A power take-off drive might still further improve this machine; the present drive is from the main wheels.

Denning & Co. (Somerset) had a powerfully built hay and straw baler which, after initial teething troubles, is now a very satisfactory machine. A very strong wind and some lack of skilled handling did not show this baler at its best, but it is to be seen on many farms to-day doing really good work.

A high-light of the demonstration was the Foster Automatic Stack Feeder and Band Cutter, fitted to a Barclay, Ross & Hutchison 54' Thresher. The name Stack Feeder does not perhaps accurately

describe the functions this appliance discharges, which is sheaf feeding from the stack to the drum. Although the weather was anything but ideal for threshing, it was quite obvious that this attachment would easily save at least two men in the threshing gang and do the work of pitching from the stack irrespective of its height, cutting the bands, and automatically feeding the sheaves into the drum in an efficient manner.

Mounted on the same thresher was a Richard Simon & Sons Automatic Weighing Machine, which not only does the work of weighing off with accuracy, but struck one as also being a labour-saver.

MACHINES ON EXHIBITION.

It is not possible even to mention the many well-known and proved machines and implements which were on exhibition, while only a brief note can be made of those which may be described as new and of general application.

Harrison, M'Gregor & Co. Ltd., Leigh, Lancs., had on view the new Albion 5A direct drive 6' cut binder. This machine incorporates all the good features of the firm's horse and tractor-draught binders. It is being produced in large numbers, and is the only machine of this sort being manufactured in the United Kingdom. Trials and tests have established the fact that this is a soundly constructed and efficient binder.

Royle Trailers Ltd., Harvington, Kidderminster, exhibited a two-wheel tractor trailer, a tipping model which seemed to be a thoroughly good outfit and one that would be a useful adjunct to most farms.

Another tipping trailer was seen, the product of *Alexander Scott, Agricultural Engineer*, North Broomage, Larbert. It tips to either side or rear, and can be raised by tractor off a power shaft or by hand gear. This three-way tipping will prove a great boon to many, but the clearance of the raising screws appeared to be insufficient.

Scottish Agricultural Industries Ltd. (Barclay, Ross & Hutchison), 67-71 Green, Aberdeen, showed two of their chemical dressers, one being fully automatic and self-metering—the other of more simple design. These efficient machines are likely to appeal more to the seed merchant and large corn grower than to the farmer, who has little difficulty in obtaining dressed seed for a moderate acreage of corn crops.

Finally, a few words about the new five-furrow tractor plough, exhibited by *John Wallace & Sons Ltd.*, 34 Paton Street, Dennistoun,

Glasgow, E.1. In this plough many novel and exclusive features are incorporated, and among them can be noted that the beams are all standard and interchangeable. The separate bodies are fastened by only three bolts and can easily be fixed in position, according to the desired furrow width, by one man. The frame and wheels are undisturbed when the position of the bodies is being changed. This plough is not yet in production, but, no doubt, will be in good demand by those who require such an adjustable implement when it is.

Altogether this was a very fine show, and it is to be hoped that similar events can be arranged from time to time to help keep farmers fully alive to the latest developments in the agricultural machinery world, and to give them opportunities to see new machines working under field conditions.

SCOTTISH RED CROSS AGRICULTURE FUND.

FOURTH ANNUAL REPORT.

REPORT ON ACTIVITIES OF THE COMMITTEE OF THE FUND
DURING THE YEAR 17TH APRIL 1943 TO 16TH APRIL 1944.
SUBMITTED TO, AND ADOPTED BY, THE GENERAL COMMITTEE
AT A MEETING HELD ON 31ST MAY 1944.

ON 16th April the Committee of the Fund completed its fourth year of operations. The total amount of contributions received during the period was £171,348, 10s. 4d. To this was added a sum of £90, 6s., being interest accruing on sums placed on Deposit Receipt for short periods. This gave a total for the year of **£171,438, 16s. 4d.**

Adding this amount to the sums raised in the preceding three years—£115,876, 14s. 2d. in 1940-41, £109,839, 6s. 10d. in 1941-42, and £151,949, 3s. 7d. in 1942-43 — gives a grand total of **£549,104, 0s. 11d.** raised by the Committee during its four years of activity.

The money raised during the fourth year was, as in preceding years, handed over at various times throughout the year to the Scottish Branch, British Red Cross Society, and the St Andrew's Ambulance Association. The sum allocated to the former body was £163,065, 2s. 1d., and to the latter £8373, 14s. 3d.—in all, £171,438, 16s. 4d. The allocation, which was made by the Allocation Committee, was at the rate of 95 per cent to the Red Cross and 5 per cent to the St Andrew's Association. A sum of £3964, 0s. 4d. was, however, excluded from the general allocation on account of the fact that it comprised sums earmarked for special purposes, such as Mrs Churchill's Aid to Russia Fund and Parcels for Prisoners-of-War. This sum was allocated entirely to the Red Cross Society to be devoted to the purposes specified.

The total allocation to the Scottish Branch, British Red Cross Society, during the past four years was £498,404, 19s. 1d., and to the St Andrew's Ambulance Association, £50,699, 1s. 10d.

The expenses incurred in connection with the Fund during its fourth year amounted to a sum of £232, 6s. 5d., being mainly for printing, stationery, and postages. These expenses were again defrayed by the Highland and Agricultural Society, which also provided the staff, office accommodation, telephone service, &c., free of charge. The Committee was, therefore, once more able to hand over every penny it received, plus Deposit Receipt interest, to the benefiting charities, without any deduction whatever for expenses.

AREA COMMITTEES.

The Area Committees throughout the country have again proved to be the main pillars of the Fund. The methods adopted by these Committees for raising money varied considerably. While some areas continued with voluntary levies or assessments, others reverted to Free Gift Sales. In many cases, however, Committees did not confine their activities to any one method, but adopted various means of raising money, including free gift sales, levies and collections, prize-drawings, dances, whist drives, &c. It will be realised that the very large sums which many of these Committees raised could not have been secured without bringing every source of revenue under tribute.

Increasing and much valued help has been forthcoming from women's organisations, including the Women's Rural Institutes and the Women's Land Army, and from Young Farmers' Clubs and other rural organisations. It must also be recorded that the urban populations of many towns, especially those with agricultural connections, have co-operated whole-heartedly with the Area Committees and have contributed most handsomely to the Funds.

The number of Area Committees which were active during the past year was fifty-six. This was a smaller number than the number which contributed in the third year, but was similar to the number which operated in the second year. The explanation of this variation is that certain Committees find it difficult to organise an effort each year, and have adopted a biennial system. A number of these will again be active in the coming year.

The subjoined list of Committees is arranged, as in previous Reports, under Highland Show Divisions. The amounts raised in each case during the year under review and in the three preceding years are given, and also the total for the four years.

ABERDEEN SHOW DIVISION.

<i>Aberdeenshire—</i>		1940-41, 1941-42, 1942-43, and 1943-44	Total
Aberdeen	.	£2,647 6 3	
		2,159 14 8	
		3,120 3 6	
		5,000 0 0	£12,927 4 5
Alford	.	£788 19 2	
		805 6 11	
		510 12 6	2,104 18 7
Cromar and Upper Deeside	.	£332 14 3	
		148 4 0	
		223 6 6	704 4 9
Carry forward	.		£15,736 7 9

	Brought forward . . .	Total.
Ellon Area	(1940-41.) £1,831 3 11	£15,736 7 9
(1941-42, 1942-43, 1943-44.)		
Ellon	£847 9 6 1,020 2 7 <u>1,198 10 4</u> £3,066 2 5	
Foveran	£608 15 1 1,360 14 4 <u>1,472 15 2</u> £3,442 4 7	
Hatton	£1,025 3 1 1,051 5 0 <u>1,298 10 0</u> £3,374 18 1	
Tarves	£1,500 0 0 2,006 0 0 <u>3,010 0 0</u> £6,516 0 0	
Udny	£1,267 11 6 1,290 17 9 <u>1,560 8 0</u> £4,118 17 3	22,349 6 3
Insh	1940-41, 1941-42, 1942-43, and 1943-44. £1,435 8 4 1,264 10 1 935 0 0 2,600 0 0 6,234 18 5	
Inverurie	£2,000 0 0 2,150 0 0 1,470 0 0 <u>3,150 0 0</u> 8,770 0 0	
Maud	£1,506 10 0 2,500 0 0 187 12 6 <u>16 10 10</u> 4,210 13 4	
Methlick	£500 0 0 550 0 0 <u>1,550 0 0</u> 2,600 0 0	
Monymusk and Cluny	£1,000 0 0 1,085 14 0 2,085 14 0	
Carry forward	£61,986 19 9	

			Total
	Brought forward . . .		£61,986 19 9
	1940-41, 1941-42, 1942-43, and 1943-44.		
Oldmeldrum . . . . .	..	
	£258 0 0		
	350 0 0		608 0 0
Strathbogie (Huntly)	£1,241 0 0		
	1,744 2 2		
	1,782 16 6		
	2,230 0 0		6,997 18 8
Torphins	£338 12 1		
	..		338 12 1
Turriff	£1,400 0 0		
	2,031 19 10		
	1,870 19 6		
	4,676 6 6		9,979 5 10
<i>Banffshire</i>			
Banff and Cornhill (Lower Banffshire)	£5,020 0 0		
	5,553 0 0		
	9,620 0 0		
	13,357 1 2		33,550 1 2
Dufftown	£548 5 8		
	..		
	39 7 5		587 13 1
Keith	£839 11 5		
	625 18 0		
	560 0 0		
	490 0 0		2,515 9 5
<i>Kincardineshire—</i>			
Banchory	£522 18 0		
	200 0 0		
	657 11 6		
	..		1,380 9 6
South Kincardineshire (Laurencekirk)	£2,046 0 0		
	2,419 11 6		
	2,063 5 2		
	4,002 19 3		10,531 15 11
Stonehaven	£866 4 2		
	1,064 4 6		
	1,381 12 9		
	2,238 7 3		5,550 8 8
			£134,026 14 1

BORDER SHOW DIVISION.

		1940-41, 1941-42, 1942-43, and 1943-44	Total.
<i>Berwickshire—</i>			
Duns	£3,661 18 1		
	..		
	4,288 14 6		
	3,237 5 9		£11,187 18 4
<i>Berwickshire and Roxburghshire —</i>			
St Boswells	£2,600 0 0		
	2,400 0 0		
	1,500 0 0		
	2,100 0 0		8,600 0 0
<i>Peeblesshire—</i>			
Peebles	£1,355 3 9		
	2,765 12 0		
	1,496 19 0		
	740 0 0		6,357 14 9
<i>Roxburghshire —</i>			
Hawick	£200 0 0		
	289 0 0		
	250 0 0		
	..		739 0 0
Kelso and Jedforest	£3,274 17 9		
	2,822 12 3		
	3,162 19 7		
	2,951 8 4		12,211 17 11
Newcastleton	£182 16 2		
	177 15 0		
	233 7 0		
	331 0 0		924 18 2
<i>Selkirkshire—</i>			
Selkirk	£555 7 0		
	587 6 5		
	344 0 0		
	340 0 0		1,826 13 5
			<u>£41,848 2 7</u>

DUMFRIES SHOW DIVISION.

<i>Dumfriesshire —</i>			
Annan	£590 6 2		
	753 8 0		
	1,676 2 9		
	2,720 16 6		£5,740 13 5
Dumfries	£650 0 0		
	600 0 0		
	700 0 0		
	3,069 1 0		5,019 1 0
Carry forward			<u>£10,759 14 5</u>

		Total.
	Brought forward . . .	£10,759 14 5
	1940-41, 1941-42, 1942-43, and 1943-44.	
Langholm	£219 0 0	
	..	
	..	
	..	219 0 0
Lockerbie	£773 15 9	
	..	
	2,381 3 0	
	2,336 10 0	5,491 8 9
Thornhill (Upper Nithsdale) . . .	£971 7 5	
	1,117 19 11	
	2,000 0 0	
	2,700 17 2	6,790 4 6
<i>Kirkcudbrightshire—</i>		
Castle-Douglas	£4,000 5 3	
	..	
	13,000 3 0	
	..	17,000 8 3
		<u>£40,260 15 11</u>

EDINBURGH SHOW DIVISION.

<i>East Lothian—</i>		
Haddington	£3,109 5 2	
	2,780 10 8	
	2,723 1 1	
	2,328 18 11	£10,941 15 10
<i>Midlothian—</i>		
Dalkeith	£2,100 10 10	
	2,449 0 5	
	1,863 11 10	
	2,910 19 4	9,324 2 5
Edinburgh	£1,692 7 0	
	..	
	..	1,692 7 0
Western Midlothian . . . . .	..
	..	
	£523 0 0	
	226 17 0	749 17 0
<i>West Lothian—</i>		
Bathgate	(1941-42.)	1,970 11 2
Linlithgow	£1,709 8 8	
	1,704 12 2	
	1,029 0 0	
	4,000 17 6	8,443 18 4
		<u>£33,122 11 9</u>

GLASGOW SHOW DIVISION.

		1940-41, 1941-42, 1942-43, and 1943-44.	Total.
<i>Argyll—</i>			
Kilfinan and Tighnabruaich	.	£114 10 0 202 10 0 154 10 8	£471 10 8
Mid-Argyll	.	£150 0 0 300 0 0	450 0 0
<i>Ayrshire—</i>			
Ayr (South Ayrshire)	.	£4,000 0 0 25 0 0 3,600 0 0	7,625 0 0
Kilmarnock (North Ayrshire)	.	(1940-41) 550 0 0	550 0 0
<i>Lanarkshire -</i>			
Biggar	.	£2,017 10 0 1,570 6 8	3,587 16 8
Lanark	.	£4,009 13 9 3,636 1 8 6 19 6	7,652 14 11
Strathaven	.	(1940-41) 750 0 0	750 0 0
Wishaw	.	£1,357 19 0 1,034 6 0	2,392 5 0
<i>Renfrewshire -</i>			
Paisley	.	(1942-43) 2,000 0 0	2,000 0 0
			<u>£25,479 7 3</u>

INVERNESS SHOW DIVISION.

<i>Inverness-shire —</i>			
Inverness	.	£590 5 6 1,903 11 4 1,511 8 8 1,446 11 11	£5,451 17 5
<i>Moray—</i>			
Elgin, Forres, &c.	.	£3,505 9 8 3,475 4 9 1,945 13 8	8,926 8 1
Carry forward	.		£14,378 5 6

	Brought forward . . .	Total, £14,378 5 6
<i>Nairnshire—</i>	<i>1940-41, 1941-42, 1942-43, and 1943-44.</i>	
Nairn	£1,130 0 0 1,300 0 0	2,430 0 0
<i>Ross-shire—</i>		
Dingwall	£3,968 14 6 10,613 1 9	14,581 16 3
Tain	£1,211 17 6 4,886 18 8	6,098 16 2
<i>Sutherland—</i>		
Dornoch	£1,110 0 0 1,060 0 0 1,166 6 11 1,251 2 1	4,587 9 0
		£42,076 6 11

PERTH SHOW DIVISION.

<i>Fife—</i>		
Anstruther	£1,465 0 0 1,627 2 0 1,630 0 0 3,500 0 0	£8,222 2 0
Cupar	£2,007 7 11 2,678 8 3 2,642 13 2 3,000 0 0	10,328 9 4
Dunfermline	£1,770 14 8 2,056 8 7 1,077 0 0 2,686 6 8	7,590 9 11
Thornton	£2,000 0 0 2,300 0 0 2,100 0 0 2,100 0 0	8,500 0 0
<i>Kinross-shire—</i>		
Milnathort	£1,270 0 4 1,550 0 0 1,220 0 0 1,500 9 6	5,540 9 10
	Carry forward . . .	£40,181 11 1

		Total
	Brought forward . . .	£40,181 11 1
<i>Perthshire</i> —	1940-41, 1941-42, 1942-43, and 1943-44.	
Aberfeldy	£1,606 3 7	
	2,597 13 2	
	4,203 16 9	
Blairgowrie	£2,127 10 4	
	3,402 0 0	
	4,015 12 5	
	7,000 0 0	
	16,545 2 9	
Perth	£4,801 3 8	
	5,278 19 11	
	6,467 8 9	
	9,090 0 0	
	25,637 12 4	
Pitlochry	£620 0 0	
	696 16 4	
	385 13 10	
	431 16 10	
	2,134 7 0	
	£88,702 9 11	

STIRLING SHOW DIVISION.

<i>Perthshire</i> -		
Crieff, &c. (Strathearn)	£2,031 11 10	
	2,014 8 9	
	1,647 2 5	
	190 13 0	
	£5,883 16 0	
<i>Stirlingshire</i> -		
Drymen	(1940-41)	371 10 0
Falkirk	£2,373 11 4	
	2,129 18 0	
	1,034 18 3	
	2,162 9 11	
	7,700 17 6	
Stirling	£5,013 0 0	
	4,610 0 0	
	3,200 0 0	
	3,750 0 0	
	16,573 0 0	
	£30,529 3 6	

COUNTY OF ANGUS.

Arbroath	£2,309 7 0	
	2,763 7 3	
	2,529 2 1	
	1,822 19 7	
	£9,424 15 11	
Brechin	£1,600 0 0	
	3,437 3 5	
	3,446 15 1	
	3,730 19 11	
	12,214 18 5	

Carry forward . . . £21,639 14 4

			Total.	
	Brought forward . . .		£21,639 14	4
	1940-41, 1941-42, 1942-43, and 1943-44.			
Dundee	£2,003 3 0			
	2,488 2 0			
	2,031 0 0			
	970 0 0		7,492 5	0
Forfar	£3,500 0 0			
	3,951 0 0			
	3,670 0 0			
	3,955 0 0		15,076 0	0
Montrose	£2,319 18 4			
	3,026 6 9			
	2,284 10 0			
	5,035 8 8		12,666 3	9
			£56,874 3	1

ABSTRACT.

Division.	1940-41.	1941-42.	1942-43.	1943-44.	Total.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Aberdeen	23,364 13 3	29,267 6 10	31,334 5 1	50,060 8 11	134,026 14 1
Border	11,830 2 9	9,042 5 8	11,276 0 1	9,699 14 1	41,848 2 7
Dumfries	7,204 14 7	2,471 7 11	19,757 8 9	10,827 4 8	40,260 15 11
Edinburgh	8,611 11 8	8,904 14 5	6,138 12 11	9,467 12 9	33,122 11 9
Glasgow	12,685 2 9	3,775 11 8	8,564 2 2	454 10 8	25,479 7 3
Inverness	6,880 17 6	6,469 1 0	22,783 0 9	5,943 7 8	42,076 6 11
Perth	17,668 0 6	19,589 15 1	22,136 1 4	29,308 13 0	88,702 9 11
Stirling	9,789 13 2	8,754 6 9	5,882 0 8	6,103 2 11	30,529 3 6
County of Angus	11,732 8 4	15,665 19 5	13,961 7 2	15,514 8 2	56,874 3 1
Totals	109,767 4 6	103,940 8 9	141,832 18 11	137,379 2 10	492,919 15 0

From the foregoing review it will be seen that the Area or Centre Committees have again proved themselves to be the main source of income to the Fund. Of the total raised in the fourth financial year, no less a sum than £137,379, 2s. 10d. was raised by the Area Committees. It has been a splendid co-operative effort. All the Executives and Officials in the Counties and Districts who shared in these exertions can take a just and real pride in the final result. In this, the fourth year of general effort and endeavour, it might have been supposed that war weariness would tend to depress the efforts of the County and District Committees. On the contrary, however, it has been found that the Executives have intensified and expanded their efforts, with greatly increased benefits to the Red Cross. The fine spirit amongst our agricultural community, of which this result is unquestionably the manifestation, must not remain unrecorded or unacknowledged. In the various enterprises of the Area Committees, whether by way of Free Gift Sales, Voluntary Levies, or otherwise, the organisers and their public have collaborated in a spirit of enthusiasm and generous support. Such understanding and comprehension of the needs of the Red Cross and of our Prisoners-of-War has given the keenest satisfaction and pleasure to the Committee of the Fund.

In this common purpose, where all have given of their best, it is perhaps invidious to single out certain Areas as exceeding others in the extent of their contributions. Yet it is only right to acclaim, with, it is felt, the full admiration and esteem of other Committees, those Centres which have sent in outstanding sums. It is in this view that the Committee have to record a fourth contribution from the Lower Banffshire Area Committee amounting to the magnificent sum of £13,357. During the past four years that Committee has sent in to the Fund a grand total of £33,550—a unique record of unstinted and generous giving. It represents the highest aggregate sent in by any Area Committee, and to the Lower Banffshire Executive there must be accorded special congratulations.

The Perth Local Committee has also excelled once more in the extent of its contribution, with a splendid total, for the fourth year, of £9090. Perth has thus again given proof of its undiminished effort and warm concern for the cause of the Red Cross.

In the Ellon Area of Aberdeenshire, with enterprising Committees operating at five Centres (Ellon, Foveran, Hatton, Tarves, and Udney), a particularly fine total of £8540 was raised, of which the Tarves Centre contributed no less than £3010. From the Eastern District of Perthshire, with its centre at Blairgowrie, the impressive sum of £7000 was returned—a specially fine effort by the East Perthshire Farmers and Burghs Committee, which, like its sister Committee at Perth, has in successive years increased its donation with open-handed generosity. At Montrose Centre, where, amongst other activities, a most successful Free Gift Sale was held, the Area Committee succeeded in raising the outstanding sum of £5035. Farther North, the ever-active Aberdeen and Area Committee sent in the splendid offering of £5000.

Other notable contributions to the Fund came from Turriff, £4676; South Kincardineshire (Laurencekirk), £4003; Linlithgow (West Lothian Agricultural Society), £4001; Forfar, £3955; Stirling, £3750; Brechin, £3731; Anstruther, £3500; Duns, £3237; Inverurie, £3150; Dumfries, £3069; and Cupar, £3000.

These impressive returns have a special significance, for they indicate a spirit of kindly and growing concern in the cause of the Red Cross and its mission. In the foregoing record will be found many other notable contributions from all districts of Scotland. From these it is obvious that where the cause is good there is no limit to the response of kindly givers. In the case of the lesser contributions received, the amount of these was no doubt determined by the fact that their Committees were operating in smaller areas. The grand total of contributions, however, could not have been built up to its present record total without the essential and splendid co-operation of all Centres throughout the country. That the smaller Centres have continued to work so steadfastly for the fourth successive year is a fine tribute to the quality of their Executives, whose splendid help the Committee of the Fund acknowledge with heartfelt gratitude.

It will be seen from the following table that the Area and

County Committees have sent in to the Fund during the past four years a grand total of £492,920. That is indeed a marvellous result of their joint endeavour and enterprise. With profound gratitude and admiration the Committee of the Fund acknowledge that remarkable achievement.

The following list shows the amounts raised by the Area Committees, arranged in order of Counties :—

County.	1st Year 1940-41.	2nd Year, 1941-42.	3rd Year, 1942-43.	4th Year, 1943-44.	Total.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Aberdeen .	13,521 14 0	19,404 12 10	17,051 15 8	29,932 13 10	79,910 16 4
Angus .	11,732 8 4	15,665 19 5	13,961 7 2	15,514 8 2	56,874 3 1
Argyll .	..	114 10 0	352 10 0	454 10 8	921 10 8
Ayr .	4,550 0 0	25 0 0	3,600 0 0	..	8,175 0 0
Banff .	6,407 17 1	6,178 18 0	10,180 0 0	13,886 8 7	36,653 3 8
Berwick .	4,911 18 1	1,200 0 0	5,038 14 6	4,287 5 9	15,437 18 4
Clackmannan	1,000 0 0	461 0 0	235 0 0	840 0 0	2,536 0 0
Dumfries .	3,204 9 4	2,471 7 11	6,757 5 9	10,827 4 8	23,260 7 8
East Lothian	3,109 5 2	2,780 10 8	2,723 1 1	2,328 18 11	10,941 15 10
Fife .	7,243 2 7	8,661 18 10	7,449 13 2	11,286 6 8	34,641 1 3
Inverness .	590 5 6	1,903 11 4	1,511 8 8	1,446 11 11	5,451 17 5
Kincardine .	3,435 2 2	3,683 16 0	4,102 9 5	6,241 6 6	17,462 14 1
Kinross .	1,270 0 4	1,550 0 0	1,220 0 0	1,500 9 6	5,540 9 10
Kirkcudbright	4,000 5 3	..	13,000 3 0	..	17,000 8 3
Lanark .	7,529 17 9	3,636 1 8	2,611 12 2	..	13,777 11 7
Midlothian .	3,792 17 10	2,449 0 5	2,386 11 10	3,137 16 4	11,766 6 5
Moray .	..	3,505 9 8	3,475 4 9	1,945 13 8	8,926 8 1
Nairn .	..	..	1,130 0 0	1,300 0 0	2,430 0 0
Peebles .	1,960 8 9	2,765 12 0	1,496 19 0	740 0 0	6,962 19 9
Perth .	12,686 9 5	13,236 5 0	16,303 10 7	17,857 9 10	60,083 14 10
Renfrew .	..	..	2,000 0 0	..	2,000 0 0
Ross and Cromarty .	5,180 12 0	..	15,500 0 5	..	20,680 12 5
Roxburgh .	4,907 13 11	4,489 7 3	4,396 6 7	4,332 8 4	18,125 16 1
Selkirk .	655 7 0	587 6 5	344 0 0	340 0 0	1,926 13 5
Stirling .	5,258 1 4	4,434 18 0	2,809 18 3	3,927 9 11	16,430 7 6
Sutherland .	1,110 0 0	1,060 0 0	1,166 6 11	1,251 2 1	4,587 9 0
West Lothian	1,709 8 8	3,675 3 4	1,029 0 0	4,000 17 6	10,414 9 6
	109,767 4 6	103,940 8 9	141,832 18 11	137,379 2 10	
Grand total raised by the Area Committees during the four years					492,919 15 0

The sums contributed by Area Committees have been set out in the foregoing list under their respective counties. It should be noted that the figures relate only to sums received from the Area Committees, and that they do not include other contributions sent in from these counties. It may also be mentioned that an Area Committee may operate from a centre so near the boundary that its area of activity inevitably extends into a neighbouring county. While the figures given, therefore, represent the allocation to the respective counties of sums received from centres in these counties, the figures may not be taken as an absolute record of the effort of any county on behalf of the Fund.

For the year under review, it will be observed from the foregoing list that Aberdeenshire and Perthshire retain first and second places with total contributions of £29,933 and £17,857 respectively ;

succeeded by Angus, £15,514 ; Banffshire, £13,886 ; Fife, £11,286 ; and Dumfries-shire, £10,827.

Of the aggregate totals for the four years, Aberdeenshire, with a grand total of £79,911 ; Perthshire, with £60,084 ; and Angus with £56,874, retain respectively the first, second, and third positions which they held in the previous year.

Victory Lamps.—Through the good offices of the Scottish Branch of the British Red Cross Society, the Committee of the Red Cross Agriculture Fund in England presented to this Fund six replicas of the Florence Nightingale Lamp which had been given by Lord Iliffe to the English Fund in order to mark a special occasion. It was decided that these should be presented to the Scottish Area Committees which had raised the largest sums during the first three years of the Fund. In recognition of their signal efforts in aid of this Fund the following Committees were accordingly presented with these replicas : Dingwall, Ellon, Lower Banffshire, Perth, Stewartry (Castle-Douglas), Stirling.

VICTORY GARDEN SHOWS AND SALES.

It has to be reported, with much pleasure, that continued and vigorous support has been accorded by the Executives and Members of Garden and Allotment Societies and Associations throughout Scotland during the Season 1943. The intensity of their effort is best illustrated by the following table of returns for the past three Seasons :—

Season 1941	.	.	.	.	£1,914	16	1
Season 1942	.	.	.	.	3,888	15	7
Season 1943	.	.	.	.	7,944	7	8
Total	.	.	.	.	<u>£13,747</u>	<u>19</u>	<u>4</u>

It will thus be seen that in each Season the amount contributed has progressively doubled. It is an aim, or rather hope, common to all appeals to "double the amount this time," but surely there are few cases where this has been done, as the above record proves, with such remarkable precision.

Taking into account a sum of about £120 received prior to the launching of the Scheme, the grand total subscribed to this Fund of the Red Cross by Scottish Amateur Gardeners is £13,868—a very notable performance.

Shows and Sales of Garden Produce were held throughout the months of August, September, and October. From the beginning it was obviously the intention of the various Executives to enlist the fullest interest amongst their Members and supporters, and their confidence and enthusiasm have been matched by the generous support received. Almost all Societies and Associations outstripped their previous returns. It was a Season of high endeavour, with a bountiful return for the Red Cross.

In the List of Contributions there appear both small and large sums, all reflecting the result of warm-hearted endeavour on the part of the District Societies and Associations. Unfortunately, several Shows were largely ruined through unfavourable weather conditions, and the resulting loss in revenue caused much disappointment to their organisers. Such risks are inseparable from these ventures, and the Committee expresses real sympathy with the organisers in this seeming frustration of their labours.

Of the several notable contributions made during the Season, an outstanding one of £587 was made by the Kirkcaldy Joint Victory Garden Show Committee, always in the forefront in diligent enterprise. This constitutes a record contribution. A further notable contribution of £400 also came from the County of Fife, and was made by Leven and District Gardens and Allotments Association. Carmyle Gardens and Allotments Committee, Glasgow, sent in the fine total of £365. Other outstanding contributions were made by:—

Ballantrae (Ayrshire)	£350	Bishopshire (Kinross-shire)	£170
Longcroft (Stirlingshire)	311	Glasgow Federation of Allot-	
Oban (Argyll)	304	ment Holders Associations	153
Dalmellington (Ayrshire)	300	Hillington (Renfrewshire)	150
Royal Caledonian Horticul-		Parkhead and Sighthill (Edin-	
tural Society (Edinburgh)	300	burgh)	150
Bonnybridge (Stirlingshire)	272	Chirnside (Berwickshire)	147
Haddington (East Lothian)	270	Musselburgh (Midlothian)	140
Whitburn (West Lothian)	212	Kennoway (Fife)	139
Burnside Wardens (Glasgow)	180		

These returns are quoted, not entirely because they are the leading ones, but to emphasise the fact that, whereas in the previous Season a return of £100 was considered a notable one, the foregoing review is evidence of the general raising of targets, and of their realisation.

The following list, showing the aggregate of sums sent in by the leading contributors to the Fund during past Seasons, is an indication of the substantial support accorded to the Red Cross:—

Kirkcaldy	£882	Longcroft	£501
Royal Caledonian Horticul-		Carmyle	495
tural Society	690	Bonnybridge	460
Haddington	547	Oban	438
Leven	510	Dalmellington	420

It would be impracticable in this necessarily brief review to refer to all those who have given devoted and unsparing service in the direction, planning, and execution of the various enterprises. Many of the Presidents and Executives are known, and to these grateful acknowledgments have been expressed. There are others, however, unknown by name, whose tasks of solid achievement have been decisive and whose labours have rendered possible the attainment of this grand total.

The General Committee is well aware of the firm purpose and

strenuous endeavour which have produced such a fine harvest for the Red Cross. These efforts have been a revelation of the fine spirit and temper of those who have laboured so successfully during the past Season. It is with pride, therefore, that they wish to acknowledge, with all gratitude, the fine support given by Scottish Horticultural Societies and Allotment Associations.

FARM WORKERS' CONTRIBUTIONS.

During the past year a total of £387, 12s. 3d. was received on account of contributions by Farm Workers, as against £481, 12s. 11d. in the previous year. Although that may not seem to be a large contribution from Scottish Farm Workers, it has to be observed that it is by no means an index to the generosity and support accorded by Farm Workers to the Fund. It is known that many Farm Workers have attached themselves to other Red Cross schemes functioning in their respective districts, while otherwise they have associated themselves with, and given valuable support to, the Area and County Committees.

Farm Workers in East Lothian maintained their lead in these contributions, and, of the foregoing total of £387, 12s. 3d., contributed no less than the sum of £170, 1s. 4d. This, taken in conjunction with their previous returns, must be held as an excellent record of sustained contribution. Other centres continuing to send in these welcome and valued contributions include Ayr, Dalkeith, Dufftown, Duns, Kelso, St Boswells, Tain, and Udny.

To all contributors, as well as to those officials who have kindly undertaken the collection and forwarding of the contributions, the Committee of the Fund extends its warm thanks.

OTHER CONTRIBUTIONS.

It is also with pleasure that reference is made to other contributions not arising through the regular channels.

First amongst these must be mentioned the impressive sum of £12,000 (to account) sent in by Mr Hugh Bone, Secretary of the Ayrshire Cattle Herd Book Society. This large sum was contributed by Members of the Society who had gifted animals which were sold at various Sales throughout the country. These Sales were eminently successful, resulting in this conspicuous contribution to the Fund. The example set by the Ayrshire Cattle Herd Book Society will, it is hoped, be followed by other Scottish Breed Societies.

As a result of a Third Appeal by the Scottish Council of the National Association of Corn and Agricultural Merchants, Mr D. Jeffrey Aitken, O.B.E., the Scottish Secretary, sent in the remarkably fine contribution of £5642. Individual Members of the Association responded to the appeal with generous support, both by way of direct subscriptions and by the granting of Bonds of

Annuity, the latter of which will provide a continuing revenue to the Fund. This weighty support from members in the Eastern, Northern, Western, and Berwick Areas of the Association is very highly appreciated.

From Scottish Agricultural Industries Ltd., including its branches and subsidiary companies trading in the Scottish Area, a third and increased contribution of £800 was received. The continuing support of the Fund by that Company is highly gratifying to the Committee.

The Chartered Surveyors' Institution, the Scottish Agricultural Machinery Association, and the Wool Federation of Scotland also gave valued support to the Fund during the year.

A notable donation of £1000 was received from Mr George Grant of Glenfarclas, being the largest donation received by the Fund from any one individual. The record was held previously by "A Berwickshire Farmer" who gifted a sum of £782.

The Registered Milk Producers of the Aberdeen and District Milk Marketing Board continued their periodical contributions, as also the Staff of the Edinburgh and East of Scotland College of Agriculture. The British Basket and Besto Co. Ltd., Glasgow, the Perth Ram Society, and the Crichton Royal Institution, Dumfries, are amongst other donors who have renewed their valued contributions.

Welcome allocations from the County War Funds continue to be made. From the War Schemes Fund of the Lord-Lieutenant of Wigtownshire a substantial sum of £250 was received, as also one of £200 from the County of Dumbarton War Benevolent Fund.

A new source of revenue was opened up by the proceeds derived from Ploughing Matches. Two notable returns were made—one of £687 from the Dunmore Ploughing Match, and the other of £110 from a competition organised at Kirkliston by the West Lothian Agricultural Executive Committee.

The Farm Workers of East Lothian organised a second Horse Parade at Haddington, as a result of which they handed over to the Fund the handsome sum of £261.

Various Whist Drives and Dances have again contributed welcome support to the Fund. The most outstanding of these was a function recently organised by the Mid-Calder and District Farmers' Committee which raised the remarkable sum of £675. Other efforts of this and similar nature included the following: Overtown, Wishaw, £187; Shettleston and Chryston Branch of the N.F.U., £95; Alford and District Young Farmers' Club, £71; Kincardineshire Farmers' Club, £68; Crossroads and District Young Farmers' Club, £60; Former Students' Club of the West of Scotland Agricultural College, £64; Edinburgh and District Young Farmers' Club, £52; Cairn (Dumfriesshire), £42; Mr J. Kirkpatrick, Auchenclosh, Thornhill, £38; Mr Alexander Waddell, Dewshill, Salsburgh, £34; Drumlithie S.F.S.U., £32; and many other regular contributors.

A specially pleasing donation was one of £296 from H.M.S. *Jackdaw* (Royal Naval Air Station, Crail), being the total of

periodical contributions by the personnel of the Station towards the Prisoners-of-War Fund. Messrs James MacGregor Ltd., Garrion Mills, Wishaw, made a handsome allocation of £300 in respect of the sale of their "Bonnie Scotland" calendars. As in the preceding year, the boys of Loretto School, Musselburgh, made over to the Fund the amount of the earnings, amounting to £65, due to them for work in local Market Gardens; and the children of Musselburgh Grammar School, by way of various enterprises, handed over the creditable total of £63.

As the result of Horse Parades and otherwise, there were received—Lockerbie Horse Society, £65; Lanark, Biggar, and Peebles Foal Show Society, £40; and Stirling District Clydesdale Horse Society, £27.

A welcome donation of £25, 10s. was received from Wigtown Agricultural Society. Donations sent in by Young Farmers' Clubs included a splendid one of £118 from the West of Fife, while Ayr and District sent in the substantial sum of £52, 10s.

In this short review it is not possible to refer to all the gifts which have been received throughout the year. To all warm-hearted friends of the Fund, however, who have contributed in their several ways, the Committee of this Fund is sincerely grateful for the kindly thoughts and the practical support which have been accorded.

ACKNOWLEDGMENTS.

As four-fifths of the income of the Fund during the past year was derived from the activities of the Area Committees, it is right that acknowledgment should first be made of the inestimable services rendered by these Committees. The astonishing sums raised have not been attained without anxious thought and planning, efficient organisation, and untiring effort in carrying the various enterprises to a successful conclusion. In these days of shortage of staffs, difficulties of transport, and limitation of supplies of every kind, it is obvious that only by whole-hearted enthusiasm for the cause and unwearying exertion could these Committees have carried their efforts to such marvellous results.

The General Committee are gratified to know that the Area Committees have succeeded in securing and retaining the help and co-operation of other organisations in their areas. Amongst these mention may again be made of the Women's Rural Institutes and other women's organisations. Ladies' Committees have in many cases raised substantial sums for the Fund. Another pleasing feature of the increasing success of many Area Committees is the extent to which they have secured the warm co-operation of the towns and burghs. Large sums in several instances have been raised by the generous effort of urban populations. Not only have Town Councils been helpful, but there are cases where Civic heads have acted as Conveners of Area Committees and have been amongst the most active and enthusiastic workers. To the Area

Committees, their Conveners, Members, Secretaries and Treasurers, and all associated with them in their great work, the Committee of the Fund acknowledges its debt of gratitude. As was stated last year, to them is due the credit that in this, its fourth year, the Agriculture Fund has been enabled to attain a new proud record of contributions to the Red Cross.

While Free Gift Sales have not returned to the position of being the main or only effort of Area Committees, there is a growing tendency to regard such Sales as an essential part of any general scheme. It is generally admitted that the Free Gift Sale has a special appeal to farmers, and is probably still the most productive source of revenue. The many Sales which have been held, as has previously been acknowledged, could not have been carried out without the cordial help and co-operation of the Live Stock Auctioneers, who have given freely of their services, the services of their staffs, and the use of their Marts. Practically every Live Stock Auctioneer in the country has been associated in some way with the activities of the Committees. Some have, in addition, acted as Conveners of Area Committees, and members of their staffs have acted as Secretaries and Treasurers. The indispensable help given by the Auctioneers and the valuable services rendered by their staffs are again acknowledged, and the Committee places on record its deep obligation to them and its warm thanks for their valuable work on behalf of the Fund.

The deep interest taken in the Fund by Directors and Members of the Highland and Agricultural Society, and by the Council, Members, and Officials of the National Farmers' Union and Chamber of Agriculture of Scotland, continues to be a source of gratification and encouragement to the Committee. The representatives of these bodies, and of the County and District Agricultural Societies throughout the country, constitute the solid framework of the Area Committees. Particular mention must be made of the local branches of the N.F.U. and Chamber, which have, in many cases, simply assumed the duties of Area Committees, and discharged these duties with notable success. In other areas County and District Agricultural Societies have undertaken these onerous duties with similar benefit to the Fund. To these bodies, and to their hard-working Office-bearers and Officials, the Committee again extends its most cordial and grateful thanks.

The thanks of the Committee to Horticultural Societies and Allotment Associations, to Farm Workers, and to various commercial interests and Agricultural Societies and Associations, has been expressed in preceding sections of this report dealing with these matters.

A special tribute must again be paid to the Scottish Press for the valuable publicity which it has given to the activities and progress of the Fund. Both agricultural and daily newspapers have regularly given prominence to items of special interest relating to local efforts, and this has unquestionably had a stimulating effect on the activities of other centres. Without such publicity the Fund could never have attained its present position, and the

Committee has accordingly great pleasure in placing on record its sense of gratitude to the newspapers concerned.

The Committee's relations with the Red Cross Agriculture Fund Committee in England have continued to be of the closest and most cordial nature. The efforts of that Committee, whose activities are organised on a comprehensive scale and embrace numerous lines of action, have met with conspicuous success, a marvellous total of over Four Million pounds having been raised in the four years to 1st March 1944. Some of the schemes, which have no counterpart in our Scottish organisation, such as "Dogs of Britain" and "Racing Pigeons," &c., do attract contributions from this side of the Border. These are duly handed over to the Scottish Fund, with a detailed statement, at the end of each month.

Through the courtesy of the Chairman of the Committee, Mr R. W. Haddon, and the Secretary, Mr Alec D. Robertson, all information at the disposal of the Committee is made available to the Scottish Committee. No request for information or guidance on any point of difficulty is ever left unattended to, and all the experience and acquired knowledge of the Committee and its officials are placed freely at our disposal. This help and co-operation has been of inestimable value to the Scottish Committee, which now places on record its sense of appreciation and gratitude.

JOHN STIRTON,
Hon. Secretary and Treasurer.

8 EGLINTON CRESCENT,
EDINBURGH 12, 24th May 1944.

**ABSTRACT OF RECEIPTS AND PAYMENTS BY THE HON. SECRETARY
AND TREASURER FOR THE FOURTH FINANCIAL YEAR, 17TH APRIL 1943
TO 16TH APRIL 1944.**

<i>3rd Year— 1942-43.</i>	<i>Receipts.</i>	<i>4th Year— 1943-44.</i>
	1. Sums raised by Area or Centre Committees, being the proceeds of Free Gift Sales, Voluntary Levies or Assessments, Collections, &c.	£137,379 2 10
£141,832 18 11	2. Victory Garden Shows—Proceeds of Shows and Sales held by Horticultural and Allotment Societies, also Donations, &c. —Season 1943	7,944 7 8
3,888 15 7	3. Contributions from Farm Workers (Penny-a-Week Scheme)	387 12 3
480 12 11	4. Agricultural and Allied Bodies—	
468 10 10	(1) Donations, &c.	£665 12 5
592 13 10	(2) Proceeds of Whist Drives and Dances	1,630 5 6
		2,295 17 11
3,145 1 0	5. Agricultural and Commercial Interests—	
350 0 0	Donations, &c.	7,020 3 1
	6. Grants from County War Funds	450 0 0
..	7. Ayrshire Cattle Herd Book Society—	
	Donations by Members	12,000 0 0
1,058 8 5	8. Unclassified Contributions (including Special Contributions for Prisoners-of-War Fund)	3,871 6 7
£151,817 1 6		£171,348 10 4
132 2 1	9. Interest on sums placed on Deposit Receipt for short periods	90 6 0
<u>£151,949 3 7</u>		<u>£171,438 16 4</u>

Payments.

	1. Expenses of Administration—	
£25 0 0	(1) Postages	£30 0 0
22 12 2	(2) Stationery, &c.	32 19 0
90 13 11	(3) Printing, &c.	158 2 2
9 13 6	(4) Miscellaneous Payments	11 5 3
<u>£147 19 7</u>		
	Total	£232 6 5
147 19 7	Received from the Highland and Agricultural Society of Scotland to defray expenses	232 6 5
	2. Payments to benefiting Charities—	
	(1) Scottish Branch, British Red Cross Society	£163,065 2 1
£144,023 1 7	(2) St Andrew's Ambulance Association	8,373 14 3
7,926 2 0		
£151,949 3 7		171,438 16 4
<u>£151,949 3 7</u>		<u>£171,438 16 4</u>

EDINBURGH, 24th May 1944.—I have examined the Books and Accounts of the Treasurer of THE SCOTTISH RED CROSS AGRICULTURE FUND COMMITTEE, of which the foregoing is an Abstract, and have found the same to be correctly stated, and sufficiently vouched and instructed.

GEO. JAMES GREGOR, C.A., *Hon. Auditor.*

List of Conveners and Secretaries, &c., of the Area Committees

- Centre.**
ABERDEEN . *Convener*—Lord Provost Sir Thomas G. Mitchell, Aberdeen.
Hon. Secretary—Robert C. May, Advocate, 77 Crown Street, Aberdeen.
- ABERFELDY** . *Convener*—Provost J. D. Haggart, O.B.E., Aberfeldy.
Hon. Secretary—R. J. Cameron, Bank of Scotland, Aberfeldy.
- ALFORD** . *Convener*—Alexander Philip, Wester Fowls, Leochel-Cushnie.
Joint Hon. Secretaries and Treasurers—W. A. P. Cormack, Norwood, Alford; A. Imlach, Ellangowan, Alford.
- ANNAN** . *Convener*—Colonel F. J. Carruthers, C.B., of Dormont, Lockerbie.
Hon. Secretary—Alec Knox, Solicitor, British Linen Bank, Annan.
- ANSTRUTHER** . *Convener*—Harry Thomson, Newark, St Monance.
Hon. Secretary—J. Gordon Dow, Solicitor, Anstruther.
- ARBROATH** . *Joint Conveners*—H. W. Dodds (Scott & Graham Ltd.), Arbroath; Percy E. Morgan, Windyhills, Arbroath.
Hon. Secretary—Mrs J. B. Meikle, 1 Golf Avenue, Monifieth.
Hon. Treasurer—W. Stark, British Linen Bank, Arbroath.
- AYR (South Ayrshire).** *Convener*—General Sir Charles Fergusson, G.C.B., G.C.M.G., D.S.O., &c., of Kilkerran, Bt., Maybole.
Hon. Secretary—Hugh Bone, 58 Alloway Street, Ayr.
- BANCHORY** . *Convener*—G. Davidson, Nether Balfour, Durris, Drumoak.
Hon. Secretary—David Humble, The Ley, Banchory.
- BANFF & CORNHILL (Lower Banffshire).** *Joint Conveners*—Provost John C. H. Addison, Banff; James A. Davidson, Culbeuchly, Banff.
Hon. Secretary—James M. Simpson, M.A., LL.B., Solicitor, Banff.
- BIGGAR** . *Convener*—Robin G. Murray, Waukmill, Skirling, Biggar.
Hon. Secretary—James Noble, Gowanlea, Symington, Biggar.
Hon. Treasurer—Alexander Foster, National Bank of Scotland, Biggar.
- BLAIRGOWRIE** . *Convener*—Rev. A. Wylie Smith, The Manse, Bendochy, Coupar-Angus.
Hon. Secretary—William Inverarity, C.A., Blairgowrie.
- BRECHIN** . *Joint Conveners*—W. Arnot, Fithie, Brechin; W. D. Mackenzie (The Farmers' Mart Ltd.), Brechin.
Hon. Secretary—George White (The Farmers' Mart Ltd.), Brechin.
- CASTLE-DOUGLAS** *Chairman*—R. G. D. Thomas of Southwick, Dumfries.
Hon. Secretary and Treasurer—Richard J. Singer (Wallets' Marts Ltd.), Castle-Douglas.
- CLUNY, &c.** . *Conveners*—Lady Grant of Monymusk; Mrs Claeson Gordon of Cluny, Cluny Castle, Cluny.
Joint Hon. Secretaries—H. R. Mollison, J.P., Cluny Estates Office, Aberdeen; A. W. M. Whiteley, The Schoolhouse, Monymusk.
Hon. Treasurer—J. Milton, J.P., Bank House, Sauchen.
- CRIEFF, &c. (Strathearn).** *Joint Conveners*—Sir J. Denby Roberts, Bt., Strathallan Castle, Auchterarder; Duncan M. Stewart of Millhills, Crieff.
Hon. Secretary—John D. S. Miller, M.A., B.L., 14 Comrie Street, Crieff.
- CROMAR & UPPER DEESIDE.** *Convener*—Lieut.-Colonel W. Lilburn of Coull, Aboyne.
Hon. Secretary and Treasurer—J. T. Taylor, Bank House, Tarland.
- CUPAR** . *Convener*—David Blair, Littleinch, Wormit, Fife.
Hon. Secretary—William Wilson, W.S., Cupar-Fife.
- DALKEITH** . *Convener*—John M. Morran, Tynehead Farm, Tynehead, Midlothian.
Hon. Secretary—D. M. Webster (John Swan & Sons Ltd., Auctioneers), 5 Clifton Terrace, Edinburgh.
- DINGWALL** . *Conveners*—J. Houston, Scatwell, Muir-of-Ord; Mrs MacWilliam, Garguston, Muir-of-Ord.
Vice-Conveners—A. Mann, Muiralehouse, Avoch; Miss Moore, Drummond, Evanton; A. Macdonald, Conon Brae, Conon Bridge.
Hon. Secretary—T. H. Burns, Solicitor, Dingwall.
- DORNOCH** . *Convener*—G. J. Grant, Pulrossie, Dornoch.
Hon. Secretary—D. G. Munro, Cyderhall, Dornoch.
- DUFFTOWN** . *Convener*—Hugh M'Vean, M.R.C.V.S., Craigcollachie.
Hon. Secretary—J. S. Shiach, North of Scotland Bank, Dufftown.
- DUMFRIES** . *Convener*—James Wyllie, Beaumont, Victoria Road, Dumfries.
Hon. Secretary—James Henderson, Solicitor, Dumfries.
- DUNDEE** . *Joint Conveners*—Alan Fraser (Peter M'Intyre Ltd., Auctioneers), Dundee; Joseph Murray, Balruddery Farm, Invergowrie, by Dundee.
Hon. Secretaries—J. Grafton Lawson & Co., Solicitors, Dundee.
- DUNFERMLINE** . *Convener*—William Dick, Transy, Dunfermline.
Hon. Secretary and Treasurer—W. Craig Husband, Union Bank Chambers, Dunfermline.
- DUNS** . *Convener*—H. C. Falconer, Auchencrow Mains, Reston.
Hon. Secretary and Treasurer—A. C. Fotheringham, The Bowes, Gordon.
- EDINBURGH** . *Convener*—Robert Park, Brunstane, Portobello, Midlothian.
Hon. Secretary—Miss Ann Cowan Telfer, Royal Bank of Scotland, Hope Street, Edinburgh.

Centre.

- ELGIN, FORRES, &c.** *Convener*—John Fettes, Corakie, Garmouth.
Hon. Secretaries—(Elgin) Colonel W. Ross Black, Elgin; D. G. Leslie, 92 High Street, Elgin; (Forres) Pat Mackenzie, 131 High Street, Forres; (Knookando and Elchies) C. Cruickshank, Rynagarrie, Carron.
- ELLON** . *Convener*—John B. Ross, Auchterellon, Ellon.
Joint Hon. Secretaries—James Mutch and William Watson, 20 The Square, Ellon.
- FALKIRK** . *Convener*—Robert Waugh (Thomas Binnie Ltd., Auctioneers), Falkirk.
Hon. Secretary—Robert Miller, Bonnyside Farm, Bonnybridge.
- FORFAR** . *Joint Convener*—George D. Scott (Scott & Graham Ltd.), Forfar; Ralph S. Thomson (Strathmore Auction Co., Ltd.), Forfar.
Joint Hon. Secretaries—Alex. E. Glennie (Strathmore Auction Co., Ltd.), Forfar; John L. Wishart (Scott & Graham Ltd.), Forfar.
- FOVERAN** . *Convener*—John Duguid, Burnbank, Newburgh.
Vice-Convener—John Stott, Kincaig, Foveran.
Hon. Secretary—David S. Minto, Little Haddo, Newburgh.
Hon. Treasurer—William Christie, Bank House, Newburgh.
- HADDINGTON** . *Convener*—A. G. Spence, Lempockwells, Pencaitland.
Hon. Secretary—David S. Burnet, Solicitor, Haddington.
- HATTON** . *Joint Convener*—Peter Mackie, Nethermill Farm, Cruden Bay; James Ogston, Bridgend, Cruden Bay.
Joint Hon. Secretaries—James Cruickshank, Hatton Farm, Hatton; G. D. Rumbles, Hatton.
Hon. Treasurer—F. W. Ferrier, Bank House, Cruden Bay.
- HAWICK** . *Convener*—P. E. Aitchison of Brieryhill, Hawick.
Vice-Convener—Douglas Oliver (Andrew Oliver & Sons Ltd., Auctioneers), Hawick.
Hon. Secretary—Andrew Haddon, Solicitor, Hawick.
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Hon. Secretary and Treasurer—James Ogilvie, Commercial Bank of Scotland, Huntly.
- INSCH** . *Convener*—James Downie, Waterton, Insch.
Joint Hon. Secretaries—James Barclay, Tocherford, Wartle; William Henderson, Ardmore Villa, Kennethmont; Alexander Watt, Cairnhill, Rothsay, Insch.
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Hon. Secretary—R. H. E. Fraser, Wester Feabuaie, Culloden Moor.
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Hon. Secretary and Treasurer—Robert Philip, Bank House, Inverurie.
- KEITH** . *Convener*—George Taylor, 15 Regent Street, Fife-Keith, Keith.
Hon. Secretary and Treasurer—Louis Smith, North of Scotland Bank Buildings, Keith.
- KELSO & JEDFOREST**—
- KELSO** . *Convener*—R. H. Allan, Smailholm Mains, Kelso.
Hon. Secretary—James K. Bell, Royal Bank of Scotland, Kelso.
Hon. Treasurer—J. G. G. Leadbetter, W.S., Kelso.
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Vice-Convener—John C. Brown, Hundales, Jedburgh.
Hon. Secretary—John Mabon (William Mabon & Sons, Auctioneers), Jedburgh.
- KILFINAN & TIGH-NABRUACH.** *Correspondent*—James Nicolson, Hon. Secretary of the District Farmers' Association, Fearnoch, Kilfinan, by Colintrave.
- KINROSS-SHIRE** . *Convener*—James Paton, Kirkness, Glencraig.
Hon. Secretary—George Wilson, Solicitor, Kinross.
Hon. Treasurer—William C. Forrester, British Linen Bank, Kinross.
- LANARK** . *Convener*—Ian Clark (Lawrie & Symington Ltd., Auctioneers), Lanark.
Vice-Convener—J. MacLaren, Springhill, Douglas, Lanark.
Hon. Secretary—.....
Assistant Hon. Secretary—J. Murie, Royal Bank of Scotland, Lanark.
- LANGHOLM** . *Convener*—J. J. Paterson, Terrona, Langholm.
Hon. Secretary—James M'George, Solicitor, Langholm.
- LAURENCEKIRK** . *Convener*—G. H. Russell of The Burn, Glenesk, Brechin.
Hon. Secretary and Treasurer—Rowland Reed, Solicitor, Laurencekirk.
- LINLITHGOW** . *Convener*—John M. Allison, Overton, Kirkliston.
Hon. Secretary—John Cochrane, Waterstone, Uphall.
- LOCKERBIE** . *Chairman*—J. W. Alexander, M.V.O., of Newton, Golfhill, Moffat.
Joint Hon. Secretaries—R. Y. Mackay, Solicitor, Lockerbie; George Stevenson, Solicitor, Lockerbie.
- MAUD** . *Convener*—Douglas J. Fowles, Millhill, Mintlaw.
Joint Hon. Secretaries—George Dalgarno, Rashboglea, New Deer; Robert Scott, Solicitor, Fraserburgh.

- Centre.**
METHLICK . *Convener*—The Marquis of Aberdeen, O.B.E., Haddo House.
Hon. Secretary—W. Howie, Bank Agent, Methlick.
- MID-ARGYLL** . *Correspondent*—Major J. G. Mathieson, Secretary, Mid-Argyll Agricultural Society, Ri-Cruin, Kilmartin, Lochgilphead.
- MIDLOTHIAN, Western.** *Hon. Secretary*—Maxwell C. Dick, Western District of Midlothian Agricultural Association, 125 Constitution Street, Leith.
- MONTROSE** . *Convener*—W. J. Reid, Fordhouse of Dun, Montrose.
Hon. Secretary—W. D. Johnston (John Milne & Sons), Southesk Granaries, Montrose.
- NAIRN** . *Joint Conveners*—George M. Allan, Achna-loich, Nairn; P. M. R. Pottic, Achareidh, Nairn; J. Raeburn, Scottish Farm Servants' Union, Nairn.
Joint Hon. Secretaries—A. J. Mackintosh, St Colm's, Auldearn, Nairn; George Squair, Solicitor, Nairn.
Hon. Treasurer—P. F. Lauder, M.B.E., Bank of Scotland, Nairn.
- NEWCASTLETON** . *Convener*—Thomas Elliot, Kirndeane, Newcastleton.
Hon. Secretary—Thomas C. Young, Roan, Newcastleton.
- OLDMELDRUM** . *Joint Conveners of War Charities Committee*—John Chalmers, Kilblean Cottage, Oldmeldrum; Maitland Mackie, Westertown, Rothienorman.
Joint Hon. Secretaries—Mrs Fowler, Raemar, Albert Road, Oldmeldrum; Mrs Webster, Chelwood, Albert Road, Oldmeldrum.
Joint Hon. Treasurers—Samuel Laird and W. J. Catto, North of Scotland Bank, Oldmeldrum.
- PAISLEY** . *Correspondent*—Thomas Hunter, Solicitor, Paisley, *Hon. Secretary and Treasurer*, Free Gift Sale Committee of Renfrewshire Agricultural Society and Renfrew County Branches of N.F.U., &c.
- PEEBLES** . *Convener*—John S. Dickson, Horsburgh Castle, Peebles.
Vice-Convener—Ian Clark (Lawrie & Symington Ltd., Auctioneers), Peebles.
Hon. Secretary—William Johnston, Drochil Castle, West Linton.
- PERTH** . *Convener*—The Earl of Mansfield, Logie House, Methven.
Vice-Convener—W. Lovat Fraser, Greengables, Gleneagles.
Joint Hon. Secretaries—Charles P. Campbell, Solicitor, Perth; J. T. Henderson, Solicitor, Perth. (Office, 61 George Street, Perth.)
- PITLOCHRY** . *Convener*—W. E. Paterson, Factor, Blair Atholl.
Hon. Secretary—J. C. Watson, Commercial Bank of Scotland, Pitlochry.
- ST BOSWELLS** . *Convener*—R. Scott Aiton, M.C., Legerwood, Earlstoun.
Vice-Convener—E. MacAlpine, Newtown St Boswells.
Hon. Secretary—John MacGilvray, Ash Cottage, Newtown St Boswells.
Hon. Treasurer—David Burns, Newtown St Boswells.
- SELKIRK** . *Convener*—Major C. H. Scott Plummer of Sunderland Hall, Galashiels.
Hon. Secretary—George Brunton, Harehead, Selkirk.
Hon. Treasurer—James Scott, National Bank of Scotland, Selkirk.
- STIRLING** . *Convener*—J. J. Riddick (Live Stock Marts Ltd.), Stirling.
Vice-Convener—Archibald Weir, Cauldbarns, Stirling.
Joint Hon. Secretaries—J. Oswald, Hamewith, Borestone, Stirling; William Thomson, Estates Office, Polmaise, Stirling.
- STONEHAVEN** . *Convener*—Rev. P. Lindsay Gordon, Glenbervie Manse, Drumlithie.
Hon. Secretary—Douglas Thow, Auction Mart., Stonehaven.
- STRATHAVEN TAIN** . *Correspondent*—James MacGregor, Garrison Mills, Wishaw.
Convener—George Douglas of Arboll, Fearn.
Vice-Convener—Major I. A. Forsyth, Balintraid, Delny.
Convener (Ladies' Committee)—Mrs D. J. Ross, East House, Portmahomack.
Hon. Secretary—W. R. Lennox, Commercial Bank Buildings, Tain.
- TARVES** . *Joint Conveners*—James Davidson, Moss-side, Tarves; George Presly, Braikley, Tarves.
Hon. Secretary—A. I. Smith, Tillygonie, Tarves.
- THORNHILL (Upper Nithdale)** . *Convener*—William Brown, Burnbrae, Penpont.
Hon. Secretary—W. M. Henderson, Solicitor, Thornhill.
- THORNTON** . *Convener*—Alexander Clark, Strathore House, Thornton.
Hon. Secretary and Treasurer—F. Dow, Commercial Bank of Scotland, Thornton.
- TORPHINS** . *Convener*—C. A. Ferries, West Learnoy, Torphins.
Hon. Secretary—William Kemp, Bank House, Torphins.
- TURRIFF** . *Convener*—John P. Sleigh of St John's Wells, Fyvie.
Joint Hon. Secretaries—A. A. Reid (Turriff Auction Mart), Turriff; George Stevenson, Commercial Bank of Scotland, Turriff.
- UDNY** . *Conveners*—Robert Findlay, Corthiemuir, Udney Station; Major James Keith, Pitmedden House, Udney.
Hon. Secretary—Alfred Marr, Cultercullen, Udney Station.
Hon. Treasurer—J. G. Thow, Bank House, Udney Station.
- WISHAW** . *Convener*—John Marshall (J. & J. Marshall Ltd., Auctioneers), Carluke.
Hon. Secretary and Treasurer—William Wyllie, Commercial Bank of Scotland, Wishaw.

THE CEREAL AND OTHER CROPS OF SCOTLAND FOR 1943.

THE following comparison of the cereal and other crops of 1943 with those of the previous year has been prepared by the Secretary of the Society from answers to queries sent to leading agriculturists in different parts of the country.

The queries issued by the Secretary were in the following terms :—

1. What was the quantity, per imperial acre, and quality of grain and straw as compared with last year, of the following crops ? The quantity of each crop to be stated in bushels or cwts. What quantity of seed is generally sown per acre ?—(1) Wheat, (2) Barley, (3) Oats.
2. Did the harvest begin at the usual time, or did it begin before or after the usual time ? and if so, how long ?
3. What was the quantity, per imperial acre, and quality of the hay crop, as compared with last year, both as regards ryegrass and clover respectively ? The quantity to be stated in tons and cwts.
4. Was the meadow hay crop more or less productive than last year ?
5. What was the yield of the potato crop, per imperial acre, as compared with last year ? The quantity to be stated in tons and cwts. Was there any disease ? and if so, to what extent, and when did it commence ? Were any new varieties planted, and with what result ?
6. What was the weight of the turnip crop, per imperial acre, and the quality, as compared with last year ? The weight of the turnip crop to be stated in tons and cwts. How did the crop braird ? Was more than one sowing required ? and why ?
7. Were the crops injured by insects ? State the kinds of insects. Was the damage greater or less than usual ?
8. Were the crops injured by weeds ? State the kinds of weeds. Was the damage greater or less than usual ?
9. Were the pastures during the season of average growth and quality with last year ?
10. How did stock thrive on them ?
11. Have cattle and sheep been free from disease ?
12. What was the quality of the clip of wool, and was it over or under the average ?

From the answers received, the following notes and statistics have been compiled :—

EDINBURGH DISTRICT.

MID-LOTHIAN. *Wheat*—Only moderate, and considerably affected by rust, which reduced the yield very much; 46 bushels per acre; seed sown, about $3\frac{1}{2}$ bushels per acre. *Barley*—Not up to average; 48 bushels per acre; suffered like all cereal crops through lack of sunshine; seed sown, 3 bushels per acre. *Oats*—Below average; 56 bushels per acre; seed sown, about 5 bushels per acre, depending upon variety; on higher land a little more. *Harvest*—Ten days later than in 1942; mostly well secured. *Hay*—Good crop, mostly well secured; about 50 cwt. per acre. *Meadow Hay*—About same as last year, and well secured. *Potatoes*—Quite a good crop, but less by 1 ton per acre as compared with 1942; 7 to 9 tons per acre; very little disease. *Turnips*—A much smaller crop than in previous year; 16 to 20 tons per acre; not much re-seeding. *Insects*—Generally free from such pests. *Weeds*—Owing to shortage of labour crops suffered more than usual. *Pastures*—Average growth and quality. *Live Stock*—Did quite well; cattle and sheep free from disease. *Clip of Wool*—Average crop of good quality.

WEST LOTHIAN. *Wheat*—Autumn sown, 36 to 42 bushels per acre; spring sown, 40 to 46 bushels per acre; grain and straw of good quality; seed sown, $3\frac{1}{2}$ to 4 bushels per acre; yields greatly reduced on some fields in the eastern part of the county by yellow rust. *Barley*—46 to 56 bushels per acre; grain and straw of good quality; seed sown, 3 to $3\frac{1}{2}$ bushels per acre. *Oats*—60 to 80 bushels per acre; grain and straw of good quality; seed sown, $4\frac{1}{2}$ to 6 bushels per acre. *Harvest*—Began about the usual time, cutting being general by 18th August; with excellent harvest weather in September good progress was made. *Hay*—40 to 50 cwt. per acre; a good crop secured in good condition. *Meadow Hay*—Very little grown. *Potatoes*—Earlies, 10 to 12 tons per acre; main crops, 8 to 10 tons per acre; very little disease; no new varieties planted. *Turnips*—25 to 30 tons per acre; a good crop all over; no re-sowing required; crop braided well. *Insects*—Practically no damage; less than usual. *Weeds*—Crops, being heavy, were uninjured by weeds; damage much less than usual. *Pastures*—Grazed better than for a number of years; quality good. *Live Stock*—Throve well, even where pastures were heavily stocked all spring and summer. Cattle and sheep were free from disease. *Clip of Wool*—Average in quality and crop.

EAST LOTHIAN (Upper). *Wheat*—Yields very variable owing to rust; 40 to 56 bushels per acre; grain and straw harvested in good condition; seed sown, $3\frac{1}{2}$ to 4 bushels per acre. *Barley*—Average crop; 44 to 56 bushels per acre; straw rather shorter than last year; harvested in good condition; quality good; seed sown, 3 to $3\frac{1}{2}$ bushels per acre. *Oats*—Good average crop; 56 to 72 bushels per acre; harvested in good condition; seed sown, 4 to $5\frac{1}{2}$ bushels per acre; marginal land yields, 40 to 46 bushels per acre. *Harvest*—Started a fortnight earlier than usual, but was rather long drawn out owing to broken weather; however it was all safely gathered with the help of the W.L.A., soldiers, and Italian prisoners. *Hay*—Average crop of good quality; 2 to $2\frac{1}{2}$ tons per acre. *Meadow Hay*—Very little grown. *Potatoes*—As big a crop as last year; 9 to 10 tons per acre; more blight in some varieties, beginning in August; no new varieties

grown. *Turnips*—Crops very variable; 12 to 20 tons per acre; braided well, but checked later; only one sowing required. *Insects*—Damage similar to previous year. *Weeds*—Owing to cross cropping were worse than usual; green crops not so well cleaned owing to shortage of labour; thistles, charlock, and soft weeds worse than last year. *Pastures*—Similar to last year. *Live Stock*—Throve well, and no disease reported. *Clip of Wool*—Over average.

EAST LOTHIAN (Lower). *Wheat*—Very variable owing to a serious and widespread attack of rust; average yield considerably below 1942; 56 bushels per acre; straw abundant, average about 2 tons per acre; crop ultimately secured in good condition; seed sown, 3 to 4 bushels per acre. *Barley*—Yield generally 6 to 8 bushels less than previous year; average on good barley land about 56 bushels per acre; with difficulty secured in good condition; seed sown, $2\frac{1}{2}$ to 3 bushels per acre. *Oats*—An average crop, with abundance of straw, much broken down; on good land, 70 to 80 bushels per acre; quality fair. *Harvest*—Commenced about 9th August, held up for a week by an extraordinarily heavy thunderstorm and by wet weather, became difficult and laborious, but crop finally secured in good condition. *Hay*—A good crop of ryegrass and clover; $2\frac{1}{2}$ to 3 tons per acre; acreages being very limited, the crop was fairly well got. *Meadow Hay*—None. *Potatoes*—A good crop; about 10 tons per acre on good land; relatively free from disease, although there was little time for spraying; owing to extensive acreage and scarcity of labour the harvest was prolonged, but the crop was got up in good condition; heavy-yielding Majestic the most extensively grown variety. *Turnips*—Crop good; 22 to 25 tons per acre; little difficulty in growing it, except for scarcity of labour and occurrence of wet weather. *Insects*—The most outstanding trouble was due to swede midge and greenfly, which in recent years have done much damage to green crops such as swedes, all varieties of the cabbage tribe, and even to potatoes, particularly in the western part of the county. *Weeds*—Some damage done, chiefly by annual weeds owing to a wet spell of weather in early summer; worse than usual, particularly in green crops. *Pastures*—Very little pasture now, but conditions were favourable for good grass. *Live Stock*—Throve well; cattle and sheep were free from disease. *Clip of Wool*—Average; very few sheep now in the lower part of the county.

BORDER DISTRICT.

BERWICKSHIRE (Merse). *Wheat*—Few fields escaped the blight of red rust; the yield all over was much reduced and quality also affected; those free from rust gave a normal crop of 44 bushels per acre, others yielding little more than half that quantity; bushel weights varied accordingly, up to 62 lb., while the worst samples were under 60 lb.; straw also was affected in quality and weighed light at 28 cwt. per acre; seed sown, 3 to 4 bushels per acre. *Barley*—A reasonably good crop, but much laid by harvest-time; quality below average; yield disappointing after the previous two years; 40 bushels per acre at most, natural weight 54 lb. per bushel; straw fair quality, but only slightly over 20 cwt. per acre; seed sown, $2\frac{1}{2}$ to 3 bushels per acre according to variety. *Oats*—Generally a heavy crop, but badly laid; average 48 bushels per acre; quality fair, with some damaged at harvest-time; natural weight, 42 lb. per bushel; much of the straw was over-ripe before cutting, quality suffering in consequence; yield, 27 cwt. per acre; seed sown, 5 to 6 bushels per acre. *Harvest*—In general began early, before the middle of August; weather

very broken all cutting-time and grain began to sprout ; what looked like being a disaster owing to weather, large acreages, and shortage of hands, was saved by ten days or so of ideal conditions commencing about the 20th of September, when much was stacked ; subsequently the work dragged on well into October. *Hay*—A light crop, as a rule well mixed with clover ; to some extent damaged by weather before it could be secured ; average, 30 to 32 cwt. per acre. *Meadow Hay*—Conditions much as for field hay, but it had to stand out longer and received more weather damage ; 25 cwt. per acre. *Potatoes*—About the same tonnage as last year ; 6 tons or slightly less per acre ; there was little disease, but conditions were not good at lifting-time, weather being broken and labour scarce. *Turnips*—The poorest crop all over for very many years ; a few early-sown swedes did well, but the great majority made slow growth, while many fields had to be resown ; yellows were little better and were more affected by moth ; subsequently many roots rotted ; while the best fields reached a full average, the average was well under 20 tons per acre for swedes, and for yellows much less. *Insects*—Fly on young swedes caused much resowing, while damage by moth at a later stage is becoming worse year by year ; leather-jackets were the cause of considerable damage to crops in ploughed-out old pastures ; the serious attack of red rust on wheat was most unusual, while the cause has never been satisfactorily explained ; some varieties were much more affected than others. *Weeds*—With the necessity for repeated cross-cropping annual weeds are undoubtedly becoming more numerous, and these all take a toll of plant food ; charlock appeared to be less in evidence, but acid spraying is becoming more general. *Pastures*—Grass made little growth until well into June ; even then the older pastures were slow to come away ; by late summer feeding was plentiful, but left little roughage for the autumn. *Live Stock*—With the shortage, sheep naturally did fairly well, but cattle did not improve much in the forepart of the season ; cattle and sheep generally were free from disease. *Clip of Wool*—Quality good ; weight well above average.

BERWICKSHIRE (Lammermoor). *Wheat*—Acreage slightly larger than last year ; the crop came through an open winter well, and, over all, was clean ; an attack of yellow rust affected 60 per cent of the crop ; yield of crop free from rust, 36 to 40 bushels per acre ; affected crop reduced by 5 to 25 per cent according to severity of attack ; in one or two severe cases yield was reduced to 8 bushels millable wheat per acre ; quality of grain in healthy crops, good ; seed sown, 4 bushels per acre. *Barley*—Considerable increase over last year's acreage ; grown on some high-lying farms for the first time ; yield not so good as last year ; 36 to 42 bushels per acre ; quality of grain, fair ; seed sown, 3½ bushels per acre. *Oats*—Acreage similar to last year ; crop over all very good, but in a number of cases quality suffered owing to lodging ; yield not so good as last year, 40 to 48 bushels per acre ; bulky straw crop of fair quality ; seed sown, 5 bushels per acre. *Harvest*—Commenced at usual time towards end of August ; earlier rain had caused bad lodging in barley and oats, and this, with increased acreage and shortage of labour, resulted in a protracted harvest ; a bulky crop was ultimately secured in fair condition. *Hay*—Crop heavier than last year ; 1½ to 2 tons per acre where not grazed ; early hay was secured in first-class condition ; some difficulty in securing end of season crops. *Meadow Hay*—Smaller acreage cut ; good crop, fairly well secured. *Potatoes*—Increased acreage over last year ; considerable acreage grown for certified seed ; crop successfully secured ; yield better than last year ; 7 to 8 tons per acre ; some blight, but not serious ; no new varieties of note ; considerable damage done by crows. *Turnips*—Crop not so good as last year ; cleaning made very difficult by previous

cross cropping, shortage of labour, showery weather, and prevalence of weeds of all kinds; some trouble with turnip fly caused resowing here and there; yellow turnips finished a poor crop; swedes better; average, about 15 tons per acre. *Insects*—Some cases of turnip fly and one or two of frit fly attack on cereals, but not significant; over all, damage greater than last year; too many crows continued a menace to farming. *Weeds*—Continued grain cropping and labour shortage led to prevalence of weeds; thistles among grain and potatoes; wrack and runches among turnips; protracted rains in June made cleaning of root crops very difficult. *Pastures*—After an open winter were full bite in early spring; growth continued well throughout the summer and into late autumn. *Live Stock*—All classes thrived well with good lambing, especially among hill sheep stocks; all classes of cattle did well, but the incidence of disease among sheep, especially lambs, was still much too high. *Clip of Wool*—Hill sheep crop much above the average both in weight and quality; low ground clips average, and of good quality.

ROXBURGHSHIRE. *Wheat*—Winter and also spring sown got a good start and looked exceptionally well; unfortunately, a most severe attack of rust completely ruined many crops; in numerous cases 10 to 12 bushels only of inferior grain were obtained; where crops escaped, from 40 to 50 bushels per acre; there was a large crop of straw. *Barley*—Crops heavy and in many cases badly lodged; grain of inferior quality in most cases and yield below normal; 40 bushels per acre was quite usual; seed sown, $2\frac{1}{2}$ to slightly over 3 bushels per acre. *Oats*—Yield generally about average; in comparison with 1942, about 20 bushels per acre less; on good arable land, 64 bushels per acre were quite common; there was much lodged grain. *Harvest*—Cutting was fairly general about the middle of August except in the higher and later districts. *Hay*—A very good crop of first-class quality. *Meadow Hay*—A full crop of good quality. *Potatoes*—Generally a good crop, but disease was above average. *Turnips*—Braided well and looked promising, but finished very poorly, especially yellows; in general, the worst crop for a long time. *Insects*—Damage not serious; the worst enemies were wood-pigeons, rats, and rabbits. *Weeds*—Annuals prevalent, and there was too little labour to deal with them. *Pastures*—Abundance of good-quality grazing. *Live Stock*—Did well; both cattle and sheep made good weight; there was very little disease of any kind. *Clip of Wool*—Of good quality, and over average.

SELKIRKSHIRE. *Wheat*—Very little grown. *Barley*—Larger acreage than formerly; on account of the sunless summer, quantity and quality were deficient; 32 to 40 bushels per acre; seed sown, $3\frac{1}{2}$ to 4 bushels per acre. *Oats*—Increased acreage grown; on marginal land which got a top dressing of manure the result was very satisfactory; the best crop for years recorded; 32 to 46 bushels per acre according to elevation and fertility of soil. *Harvest*—Commenced about the usual time; broken weather made cutting and leading tedious; quality and quantity of grain suffered accordingly, especially in later districts. *Hay*—The best crop for a number of years, and secured in good order; about $1\frac{1}{2}$ tons per acre. *Meadow Hay*—A good crop, but in the hill districts much was never secured on account of bad weather. *Potatoes*—A much increased acreage grown with very doubtful results, the land not being suitable in many cases; yield varied from 3 tons to 8 tons per acre; no disease when raised; tubers keeping well in the pits. *Turnips*—Sown at the usual time, and braided well; swedes on some farms were fair, but on the majority yellows were the poorest crop for years. *Insects*—No damage recorded. *Weeds*—More prevalent than usual, and difficult to keep in check owing to so much

wet weather and labour scarcity. *Pastures*—Best grazing season for many years. *Live Stock*—Throve well; cattle and sheep were free from disease. *Clip of Wool*—Quality good, but weight light.

PEEBLESSHIRE. *Wheat*—Formerly very little grown, but as a war measure some of the best land was sown; winter wheat in most cases very good; 40 to 52 bushels per acre; a few crops were more or less a failure; spring-sown wheat, while a bulky crop, did not yield nearly so well, and in places lodged very badly; seed sown, 3 to 4 bushels per acre. *Barley*—Generally a good crop, but badly laid and difficult to cut; yield about average; 36 to 50 bushels per acre; samples generally good; seed sown, 3½ to 4 bushels per acre. *Oats*—Showed greatly increased acreage, and the crops were excellent; on many farms very badly laid, and the harvest proved very costly and expensive; yield, 48 to 64 bushels per acre; in high districts, 36 to 46 bushels per acre; seed sown, 5 to 5½ bushels per acre; thick-skinned varieties, 6 bushels per acre. *Harvest*—Began a few days earlier than usual. *Hay*—A very much heavier crop than in the year previous; mostly a one-way cut; generally the quality was excellent, but the hay difficult to secure on account of the uncertain weather; many crops averaged from 50 to 60 cwt. per acre. *Meadow Hay*—An average crop. *Potatoes*—Crops not so large as usual; some blight and a little disease, otherwise the quality was fairly good; dressed ware, from 6 to 7 tons per acre. *Turnips*—In general most disappointing; wet weather in early summer made the ground dirtier than usual, since the labour was not available to clean the crop properly; yellows got prematurely ripe; swedes proved a much better crop and were fairly sound. *Insects*—Wireworm did considerable damage, and injury was also caused by wood-pigeons. *Weeds*—Very much worse than usual; bad year for runches. *Pastures*—Excellent; after an early spring grass was plentiful the whole season. *Live Stock*—Did well; cattle and sheep were free from disease. *Clip of Wool*—Good quality, and above average in clip.

DUMFRIES DISTRICT.

DUMFRIES (Annandale). *Wheat*—Larger acreage grown; good crop on suitable land; fairly well harvested and quality fairly good; threshed rather better than last year, average 26 cwt. per acre; seed sown, 4 bushels per acre. *Barley*—Larger acreage grown; fairly well harvested and threshed fairly well; 20 to 24 cwt. per acre; seed sown, 2½ to 3 bushels per acre. *Oats*—Acreage similar to last year; crops good and mostly well harvested; 55 bushels per acre on good land; 30 bushels per acre in higher districts; seed sown, 4 to 6 bushels per acre. *Harvest*—Began about third week in August and finished about first week in October; crops were again badly laid and difficult to harvest, but on the whole the sample of grain was better than last year. *Hay*—Ryegrass a heavy crop and well got, about 35 to 40 cwt. per acre. *Meadow Hay*—Well got where cut in good time, but a large quantity very badly secured in the later districts; 25 to 30 cwt. per acre. *Potatoes*—Much larger acreage grown; on the whole a good crop and fairly free from disease; lifting started third week of October, but owing to shortage of labour the work was prolonged; yield, 8 tons per acre. *Turnips*—A good crop; they braided well and very little resowing had to be done; 18 to 20 tons per acre. *Insects*—Not much trouble experienced; some damage was caused by crows, which seem to be getting more numerous. *Weeds*—Annuals seemed more plentiful than usual, and owing to scarcity of labour damage caused was greater. *Pastures*—Were good during season and mostly heavily stocked

owing to smaller acreage of grass. *Live Stock*—Did very well, especially in the later months ; cattle and sheep were free from disease. *Clip of Wool*—Good ; weight much the same as last year.

DUMFRIES (Nithsdale). *Wheat*—None grown. *Barley*—None grown. *Oats*—A good crop ; some laid, but not so badly as last year ; threshed well. *Harvest*—Earlier than last year by about three weeks ; started in the end of August ; late districts had a very good harvest in September, but those who had corn to stack in October were not so fortunate. *Hay*—A bumper crop ; the bulk well got in most cases, thanks to two very good spells of weather. *Meadow Hay*—As heavy as last year, and secured in better order ; not so heavy in comparison with rotation hay. *Potatoes*—Poorest crop for years ; about 3 to 4 tons per acre ; best quality eating potatoes for years ; free from disease. *Turnips*—Smaller crop than last year, but fairly sound ; about 12 to 18 tons per acre ; braided well, but terribly dirty ; no resowing. *Insects*—Gave no trouble ; pigeons on the increase. *Weeds*—Turnips in some cases were choked out. *Pastures*—Abundance of grass ; in June it could not be kept down, and inclined to get too strong ; in September and October soft owing to wet conditions. *Live Stock*—Did as well as last year ; cattle and sheep free from disease, except for the usual trembling and tick-borne fever in ewes and lambs. *Clip of Wool*—Fairly good ; heavier than in previous year.

DUMFRIES (Eskdale). *Wheat*—Practically none grown. *Barley*—Very little grown. *Oats*—Crops nearly all good, and not so much laid as in some years ; threshed well, but not up to last year ; yield, about 42 bushels per acre all over ; straw, about the same as in 1942 and of good quality ; seed sown, 4 to 6 bushels per acre. *Harvest*—Rather later than last year in commencing and was long drawn out ; rain made it difficult to get the cutting finished. *Hay*—Ryegrass was good and mostly all got in very good condition ; heavier than last year. *Meadow Hay*—Also good when it could be secured early in the only good hay weather of the season lasting about ten days ; in spite of the weather more was secured than in 1942. *Potatoes*—A better crop than last year and not so much disease, excepting on wet fields on which they were very poor ; no new varieties were planted. *Turnips*—Very good, very sound, and much heavier than last year ; braided well, and very little resowing required. *Insects*—Damage very much less than for some years. *Weeds*—Many crops were dirtier than usual owing to the wet weather all season after turnip-singling. *Pastures*—Very much over average growth, and many got far too strong ; the quality seemed good, but was too rough for sheep. *Live Stock*—Did well, especially cattle, but many sheep suffered from foot-rot owing to roughness of pasture ; less disease than for many years. *Clip of Wool*—Quality fully average ; very much heavier than last year.

KIRKCUDBRIGHTSHIRE. *Wheat*—Considerable acreage grown, but owing to wet season yields were rather lower than in 1942. *Barley*—Acreage rather larger than last year ; the crop was cut before being too severely lodged and gave about 18 to 20 cwt. per acre. *Oats*—Again a very heavy crop ; on many farms was much wasted owing to crop being badly lodged and cutting protracted ; when seed was not dressed with a mercurial dressing some very poor crops resulted ; yields lower at least 10 per cent from 1942. *Harvest*—Started about the usual time, second week in August, and although hardly as difficult as in 1942 it was a very hard and trying time ; the south-west's rainfall much too heavy for securing large grain harvests. *Hay*—Most ryegrass hay was secured in an excellent spell of weather in June ; and owing to a very growthy May the crop was excellent,

40 cwt. per acre ; there was also quite a good aftermath. *Meadow Hay*—A very heavy crop ; where secured before middle of July was excellent in quality ; 40 cwt. per acre. *Potatoes*—Acreage slightly larger than in 1942, but shaws went down rather too quickly in September, and some blight was apparent ; 6 to 7 tons per acre ; a very difficult time was encountered during the lifting. *Turnips*—Crop was very disappointing, and varied very much from farm to farm and even from field to field ; 15 tons per acre. *Insects*—No special trouble recorded. *Weeds*—Amongst turnip crops were much worse than usual owing to poor weather for killing them ; thistles in grassland were not so prevalent as usual. *Pastures*—For the first three grazing months grass was very abundant ; the best grazing season for many years. *Live Stock*—Cattle did quite well, but grass on the whole was too rank for lambs ; no special disease was noticeable except the prevalence of hoose or husk in calves. *Clip of Wool*—Heaviest, especially in hill areas, for several years.

WIGTOWNSHIRE. *Wheat*—Very little grown. *Barley*—Very little grown. *Oats*—Lea, 38 to 42 bushels per acre ; after green crop, 44 to 46 bushels per acre ; straw, about average, but generally crops threshed fairly well. *Harvest*—Began about the usual time ; weather was unsettled, and on many days no cutting was possible till the afternoon or evening ; much was harvested in good order in spite of broken weather, but late crops were secured in poor condition. *Hay*—Was slightly better than the previous year, and got in good condition ; probably 2 to 2½ tons per acre ; aftermath did quite well. *Meadow Hay*—About the same as usual. *Potatoes*—Early potatoes, 6 to 8 tons per acre ; later a heavier yield was obtained ; digging retarded in some cases by want of labour, and the digger was used by some growers instead of the graips ; late potatoes were a moderate crop of 8 tons per acre ; owing to a very wet October much difficulty was experienced in lifting. *Turnips*—18 to 20 tons per acre ; braided well and very little resowing done ; crop good, though disease appeared here and there ; slight frost did not affect the turnip braid, but in some cases marrow stem kale had to be resown. *Insects*—Very little damage done. *Weeds*—Dockens prevalent, and on some ground thistles gave trouble ; redshank not so bad as we have experienced, but runches were very strong in places. *Pastures*—Were better on the whole than in the previous year, and rain in August kept them fresh ; stock kept them down on most farms without much difficulty ; little silage was obtained, but on some farms grass was cut for the grass-drying plant. *Live Stock*—Dairy cows generally did better than last year in spite of the fact that the area under grass was curtailed ; young stock did quite well ; grass sickness was still with us, and there were cases of navel ill ; some stomach trouble among young calves proved difficult to cure ; mastitis among dairy stocks was still a scourge, and the most serious menace dairy farmers had to face ; sheep were fairly free from disease. *Clip of Wool*—Average.

GLASGOW DISTRICT.

AYRSHIRE. *Wheat*—Grain, 25 cwt. per acre ; straw, 20 cwt. per acre ; not so much straw as last year, but grain was secured in better condition ; seed sown, 3 bushels per acre. *Barley*—Grain, 22 cwt. per acre ; straw, 16 cwt. per acre ; not so bulky as last year, but saved in much better condition. *Oats*—Grain, 18 cwt. per acre ; straw, 18 cwt. per acre ; quality of both was much better than last year on the average ; seed sown, 4½ to 5 bushels per acre. *Harvest*—Began about the same time as last year, which was about the average for the last decade. *Hay*—33 cwt. per acre ;

about the same quantity, but average quality much better than last year; weather conditions were much better for harvesting than usual; much hay is being cut at a younger stage of growth than formerly, when clover is not so predominant as later in the season. *Meadow Hay*—Not quite so productive as last year, but a good average. *Potatoes*—Average about 7 tons per acre, the same as last year, but yield during the season did not vary so much; quality in many cases was not so good; blight started early, about the third week of July, but did not spread rapidly nor so widely as on other occasions. *Turnips*—Average about 15 tons per acre; many crops badly affected by dry rot and finger-and-toe diseases, which caused considerable waste; braided satisfactorily, and no more than one sowing was required. *Insects*—No widespread damage, but in gardens and plots slugs and snails were very bad, and cabbages were in many cases badly damaged with chafer beetles. *Weeds*—Some crops suffered from annual weeds, as the broken weather prevented their being dealt with. *Pastures*—Made very good growth throughout most of the season; quantity and quality of grazing was much better than last year. *Live Stock*—Did well on grass, more especially after mid-summer, when feeding was very plentiful; disease among dairy cattle still caused much anxiety and thought, and has not appeared to decrease; sheep diseases still required attention, but most of these were under control. *Clip of Wool*—Of good quality and quantity; slightly above average.

ARRAN. *Wheat*—Small acreage grown for first time; results were poor and unpromising. *Barley*—None grown. *Oats*—Excellent crops in most places, but on 'marginal' land poor; yield, 18 to 21 cwt. per acre; seed sown, 5 to 6 bushels per acre. *Harvest*—Began early in August, but was rather prolonged owing to wet weather. *Hay*—Well got; up to 2½ tons per acre; some grown for seed and excellent samples obtained. *Meadow Hay*—Good and fairly well secured. *Potatoes*—Good all round; the bulk grown for seed as Arran now specialises in that trade; yield about 7 tons per acre; new varieties promised well. *Turnips*—Very good in most places. *Insects*—No trouble reported. *Weeds*—Difficult to control owing to wet season. *Pastures*—Good where previously lime had been applied. *Live Stock*—Throve well and were in great demand at local sales. *Clip of Wool*—Fully up to average.

LANARKSHIRE (Upper Ward). *Wheat*—A few acres now grown; not much of it was suitable for milling. *Barley*—None grown. *Oats*—60 to 75 bushels per acre; grain and straw of good quality. *Harvest*—Began at usual time; weather good; labour short. *Hay*—2 to 3½ tons per acre; a grand crop of good quality. *Meadow Hay*—A fair crop of good quality. *Potatoes*—6 to 9 tons per acre; a better crop than last year; good weather for lifting and pitted in good condition; labour very scarce. *Turnips*—A moderate crop. *Insects*—Very little damage reported. *Weeds*—Difficult to control owing to shortage of labour. *Pastures*—Very good. *Live Stock*—Throve very well; cattle and sheep were free from disease. *Clip of Wool*—Very good.

LANARKSHIRE (Middle and Lower Wards). *Wheat*—Yield, 23 cwt. grain and 30 cwt. straw per acre; both of good quality; seed sown, 3½ to 4 bushels per acre. *Barley*—Very little grown. *Oats*—24 cwt. grain and 30 cwt. straw per acre; both of good quality; seed sown, 5 to 6 bushels per acre. *Harvest*—Began in earlier districts about the 12th August, and on the colder land a fortnight later; weather better than in 1942, and the great bulk was secured in good order. *Hay*—40 to 45 cwt. per acre; the first fortnight of July was ideal, and much good hay was secured; later

the weather was more showery. *Meadow Hay*—Similar to 1942. *Potatoes*—Approximately 8 tons per acre; not much disease; no outstanding new varieties; it was noticeable that Redskin in some cases gave a better yield than Kerr's Pink, and consequently gained in favour. *Turnips*—18 to 21 tons per acre; braided well; very little second sowing; owing to showery weather some thinning was too long delayed, and this had an adverse effect on the yield; finger-and-toe disease in some cases. *Insects*—No particular attacks reported. *Weeds*—Many crops were reduced through failure to weed timeously through lack of labour and showery weather. *Pastures*—Grazed well, but some of the colder lands would have done better with less moisture. *Live Stock*—Made satisfactory progress on the grazings; there was no particular disease among sheep, but diseases among dairy cattle more prevalent. *Clip of Wool*—Of good quality, and above the average.

RENFREWSHIRE. *Wheat*—Rather under average; on suitable land, 25 to 30 cwt. per acre; seed sown, 3 to 4 bushels per acre. *Barley*—None grown. *Oats*—An average crop; grain, 25 to 30 cwt. per acre; straw about the same yield; seed sown, 5 to 6 bushels per acre. *Harvest*—Commenced about 14th August, almost a fortnight earlier than previous year, and finished about third week in September; weather again very broken, and much grain damaged. *Hay*—About average crop; 2 to 2½ tons per acre; weather favourable, except towards end of hay-time; mostly secured in good order. *Meadow Hay*—Little grown, but where early cut secured in good order; yield, about 30 cwt. per acre. *Potatoes*—Average crop, about 1 ton per acre increase over previous year; second earlies, 9 to 10 tons per acre; main crop Kerr's Pink, 9 to 10 tons per acre; Golden Wonder now little grown; no disease, but on wet land some few acres soured; no new varieties extensively grown. *Turnips*—Good crop; 20 to 30 tons per acre; braided well; no second sowings required; odd fields ruined by pigeons and crows pulling out plants to get at wireworms. *Insects*—Damage not more serious than usual. *Weeds*—Still a menace, due to wet weather and shortage of labour. *Pastures*—Of average growth and quality and well grazed due to small acreage left. *Live Stock*—Throve well, but not many beef cattle finished on grass owing to absence of artificial feeding-stuffs. No disease reported among cattle and sheep. *Clip of Wool*—Average both in quantity and quality.

ARGYLLSHIRE (Lochgilphead). *Wheat*—Practically none grown. *Barley*—Very little grown. *Oats*—Did well on the whole, and secured in much better order than last year; grain, 30 to 36 bushels per acre; straw, 20 cwt. per acre; seed sown, 5 to 6 bushels per acre. *Harvest*—About a week later than usual. *Hay*—Quantity much the same as last year, quality very much better; mostly secured in good order; 25 to 30 cwt. per acre. *Meadow Hay*—Better than last year, but there was no hay-making weather after the end of July, and the crop suffered accordingly. *Potatoes*—No better than last year, about 4 tons per acre; blight prevalent after mid-August; wet weather at lifting-time caused considerable wastage; no new varieties. *Turnips*—About the same as last year; 20 to 25 tons per acre; braided well on the whole, and there was very little resowing. *Insects*—No damage apparent. *Weeds*—Redshank was noticeable in root crops, but the damage not extensive. *Pastures*—Came away a month earlier than last year and held out well. *Live Stock*—Did very well; cattle and sheep kept free from disease. *Clip of Wool*—Good; distinctly over the average.

ARGYLLSHIRE (Kintyre). *Wheat*—Grain similar to that of 1942;

secured in good condition; comparatively small acreage grown; seed sown, approximately $3\frac{1}{2}$ bushels per acre. *Barley*—Yield and quality of grain up to average; 19 to 24 cwt. per acre; weight per bushel, average; seed sown, $3\frac{1}{2}$ to 4 bushels per acre. *Oats*—Increased acreage grown; yields very variable; on colder, heavier soils far below average; from 12 to 28 cwt. per acre; average, 15 cwt. per acre; highest was 33 cwt. per acre; straw below average; seed sown, 5 bushels per acre, approximately. *Harvest*—Commenced second week in August. *Hay*—Yields good; average 34 cwt. per acre; secured in excellent condition. *Meadow Hay*—Rather more productive than last year. *Potatoes*—Difficulty in disposing of early crops caused delay in lifting, and consequently the return from these varieties was heavier than usual; main crop below average, 6 tons per acre; blight very widespread, and appeared early in July; yields up to 12 tons per acre recorded when spraying had been carried out; several lots of stock seed standard gave good results. *Turnips*—Weights below average, varying greatly in different districts; average of 14 tons per acre; braided well; only one sowing. *Insects*—Little damage recorded. *Weeds*—Damage by weeds greater than usual, due to wet season and shortage of casual labour. *Pastures*—More productive than in previous year, and growth well maintained to end of season. *Live Stock*—Throve well throughout the season, and were generally in good health; no serious disease reported. *Clip of Wool*—Quality and clip up to average.

ARGYLLSHIRE (Islands of Islay, Jura, and Colonsay). *Wheat*—None grown. *Barley*—The few acres grown gave a fair crop. *Oats*—An improvement on recent years; average, 43 bushels per acre; weight, 40 lb. per bushel; straw of medium quality; seed sown, 5 to 6 bushels per acre. *Harvest*—Began about 20th August and lasted until early October in remote areas; crop stood better despite unfavourable weather, and was mainly cut by binder; Government tractor service proved a boon. *Hay*—Showed an improvement on previous year, but was got with difficulty; ryegrass, about 25 cwt. per acre, and clover, about 33 cwt. per acre. *Meadow Hay*—Also did better. *Potatoes*—A better crop than last year, which was unusually bad; yield about 8 tons per acre; the usual varieties were grown; disease not prevalent and did little damage. *Turnips*—A good crop, although roots were a trifle smaller than expected in a good season; braided well, and only in a few cases, when sown on light land during a short dry spell in early spring, was resowing necessary; yield averaged 16 tons per acre. *Insects*—Little noticeable damage done. *Weeds*—No unusual damage reported. *Pastures*—Better than during the last few years, coming into grass earlier and lasting longer. *Live Stock*—Throve very well; cattle were healthy, but there was the usual fight against maggot trouble, for lack of a sure and easy specific. *Clip of Wool*—Of good quality and about average in quantity.

STIRLING DISTRICT.

DUMBARTONSHIRE (Upper). *Wheat*—Crop good, and secured in fair condition; 35 bushels per acre; straw, 30 cwt. per acre; seed sown, 3 to 4 bushels per acre. *Barley*—None grown. *Oats*—Generally very light owing to wet condition of soil throughout the whole growing season; 35 to 40 bushels per acre; seed sown, 4 to 5 bushels per acre. *Harvest*—Very slow owing to prolonged wet weather. *Hay*—Was the best of the season's crops secured, though fairly light; about 25 cwt. per acre; after-math, very poor. *Meadow Hay*—Was poor, and a good part of it never

secured. *Potatoes*—Yielded an average of 6 tons per acre ; disease was very prevalent from second week of August ; on many low-lying farms were scarcely worth lifting. *Turnips*—About 20 tons per acre ; braided well, and looked well throughout season, but did not bulk properly owing to lack of sunshine. *Insects*—Very few pests reported. *Weeds*—Damage to green crops was very severe owing to bad weather for proper cleaning ; redshank and spurrey were the most injurious. *Pastures*—Fairly good, but quality not quite up to standard. *Live Stock*—Did not do too well in the back end ; cattle and sheep free from disease. *Clip of Wool*—About the average.

General Comment.—This has been the worst season experienced for very many years in this district. There was only one decent spell of sunshine, for a fortnight in July. The ground has never been in a proper state for cultivating during the past eighteen months, with the result that large acreages are becoming quite sour, and require more drainage than usual.

DUMBARTONSHIRE (Lower). *Wheat*—A more regular crop than last year ; yield, 45 bushels per acre, at 60 lb. per bushel ; straw, 30 cwt. per acre ; quality of both good ; seed sown, $3\frac{1}{2}$ bushels per acre. *Barley*—Very little grown. *Oats*—Not so bulky as last year ; grain threshed well and was of good quality ; 50 bushels per acre, 41 lb. per bushel ; straw, 24 cwt. per acre ; seed sown, $5\frac{1}{2}$ bushels per acre. *Harvest*—Commenced about the usual time, but was more prolonged than usual. *Hay*—40 cwt. per acre ; generally very good quality ; clover not so bulky as usual. *Meadow Hay*—Rather heavier than last year. *Potatoes*—Not an average crop ; about 6 tons per acre ; disease, which showed first in early September, did not do much harm ; no new varieties planted. *Turnips*—Were not a bulky crop, but sound ; about 15 tons per acre ; braided well with the first sowing. *Insects*—Very little damage done. *Weeds*—Root crops were rather dirty with annuals, especially turnips, which were injuriously affected by redshank. *Pastures*—Grazing generally rather poor during the season, both quality and growth suffering from lack of sunshine and heat. *Live Stock*—Cattle, especially dairy cows, did not do so well as usual on pastures ; mastitis was prevalent in dairy stock, but otherwise cattle and sheep were healthy. *Clip of Wool*—Of good quality, and very much above the average in weight.

STIRLINGSHIRE (West). *Wheat*—Not much grown ; quality improved ; 17 cwt. per acre ; seed sown, 4 bushels per acre. *Barley*—None grown. *Oats*—Growing crops not so heavy as last year, but threshed about 17 cwt. per acre ; straw better quality ; late were better than early crops ; seed sown, 5 bushels per acre. *Harvest*—Began ten days earlier, but was prolonged owing to wet weather. *Hay*—Fully better than last year ; good quality. *Meadow Hay*—Also rather better than last season ; good quality. *Potatoes*—Average, 8 tons per acre ; no disease evident during growth, but did not keep too well in pits ; no new varieties. *Turnips*—Yield down from last year to about 22 tons per acre ; quality excellent ; good braid ; no resowing. *Insects*—None reported. *Weeds*—Turnip crops affected ; principal weed, persicaria ; wet weather and lack of labour contributed to greater damage. *Pastures*—Well above average in quality and quantity. *Live Stock*—Did very well ; cattle and sheep were fairly free from disease, but mastitis in cows was rather troublesome. *Clip of Wool*—Over average, and quality good.

STIRLINGSHIRE (East). *Wheat*—On suitable land well above the average ; up to 60 bushels per acre ; straw, 30 cwt. per acre ; in high-lying districts

the crop was a failure; seed sown, 4 bushels per acre. *Barley*—Crops badly laid about the beginning of August, and sample disappointing; yield average, although much had to be left on the ground; 30 to 35 cwt. per acre; straw, 25 cwt. per acre. *Oats*—Looked promising, but threshed only an average yield; colour not so good as usual owing to weather; crops badly laid and much grain lost; yield, 45 bushels per acre; straw, 30 cwt. per acre. *Harvest*—Hay-cutting began about the end of June, a week later than the previous year; corn harvest started about the middle of August, but late districts had great difficulty in securing the crops. *Hay*—Ryegrass and clover an average crop, but with a scarcity of clover; 30 cwt. per acre; quality up to last year's standard; timothy a big crop, but owing to it being badly laid, little was seeded; yield, 3 to 4 tons per acre; secured in good condition. *Meadow Hay*—Better than last year, but owing to the wet August was only of middling quality; yield, 30 cwt. per acre. *Potatoes*—Above the average on the better land, up to 9 tons per acre; in late districts a small crop, 5 tons per acre; frosts in late September spoiled the Golden Wonder variety; little disease; no new varieties grown. *Turnips*—Fair crop on the dry field; braided well; no resowing, except where crows had been active; 25 tons per acre; on carse ground a failure, few farmers getting them sown owing to wet weather. *Insects*—All crops free from pests, except turnips, especially yellows, which seemed to wilt at the end of July, and never completely recovered. *Weeds*—Charlock not so prevalent as in previous years, perhaps from want of sun; other weeds were hard to overcome owing to wet season. *Pastures*—Grass came away early, but did not last; the ground got parched in August, and did not quite recover. *Live Stock*—Did only fairly and had to be taken off earlier than usual; cattle and sheep were free from all disease. *Clip of Wool*—Moderate; quality fair.

CLACKMANNANSHIRE. *Wheat*—Braird good and crop did well, but received severe check from a storm in May which affected the grain in exposed places; yield, 35 to 48 bushels per acre; straw, 25 to 30 cwt. per acre; seed sown, 4 bushels per acre. *Barley*—Excellent crop; 45 to 56 bushels per acre; seed sown, 3 to 4 bushels per acre; some grain damaged where harvesting was late; straw, 20 to 25 cwt. per acre. *Oats*—Braided well; where early and exposed to the North, badly blasted by storm in May; on driffield badly laid by rainstorms in July with consequent loss of grain; yield, 48 to 55 bushels per acre; straw, 25 to 30 cwt. per acre; much of it of poor feeding value; seed sown, 4 to 6 bushels per acre according to variety. *Harvest*—Began about the usual time. *Hay*—A good crop; 40 to 45 cwt. per acre on driffield, and up to 4 tons per acre Timothy, in the carse. *Meadow Hay*—Little grown. *Potatoes*—Kerr's Pink, 7 to 8 tons per acre; Golden Wonder, 5 to 7 tons per acre; 14 tons per acre of Doon Star and 10 to 11 tons per acre of Red Skin were claimed by some growers; very little disease; wet weather and labour shortage hindered lifting; school children did good work under difficult conditions. *Turnips*—Where early sown, a good crop of 20 to 25 tons per acre, but not so good as last year; on heavy land many farmers were unable to sow owing to continuous wet weather in May; a little damage done by turnip fly; no second sowing reported. *Insects*—Slight damage by turnip fly; a little grub on late-sown oats. *Weeds*—Little injury caused. *Pastures*—Luxuriant throughout the whole grazing season; ploughing up of old grass and the consequent replacement by new pastures has done much to uphold the summer milk yields. *Live Stock*—Grazed well; sheep were free from disease, although cattle suffered from foul foot on some farms due to the wet season. *Clip of Wool*—A fair average.

PERTH DISTRICT.

PERTHSHIRE (Central). *Wheat*—Largest acreage ever grown in district ; yield good ; 32 to 48 bushels per acre ; straw, 24 to 30 cwt. per acre ; seed sown, 4 bushels per acre. *Barley*—More grown than usual ; crops varied from failure to very good ; 30 to 60 bushels per acre ; straw, 15 to 20 cwt. per acre ; seed sown, 3 to 3½ bushels per acre. *Oats*—Large acreage grown ; yield of grain good, although not up to previous seasons ; 32 to 60 bushels per acre ; straw, 15 to 24 cwt. per acre. *Harvest*—Started about usual time ; very broken weather, and seven weeks' harvest work very general ; much sprouting in the stook of all kinds of grain. *Hay*—An average crop with plenty of clover in most cases ; some secured in good condition, some badly wasted as good weather was very limited ; yield, 1 to 2 tons per acre. *Meadow Hay*—Very little secured owing to weather ; bulky crop. *Potatoes*—Crop less than usual ; 4 to 9 tons per acre ; earlies in many cases badly diseased and difficult to dress ; lifting very protracted due to wet weather. *Turnips*—A good average crop where weeds were kept down ; swedes, 24 to 30 tons per acre ; yellows, 18 to 24 tons per acre ; in general, second sowings were not required. *Insects*—No damage recorded. *Weeds*—Bad season, as wet weather prevented much working among crops ; day-nettles, charlock, and redshank did more damage than usual. *Pastures*—Good growth in early spring, but the wet season spoiled the quality. *Live Stock*—Did fairly well in the early part of the season ; cattle and sheep were free from disease. *Clip of Wool*—Average.

FIFESHIRE (Middle and Eastern). *Wheat*—Quantity of grain about the same as last year ; straw, above average ; quality of both not so good as in previous season. *Barley*—Good crop, except on land deficient in lime ; quality spoilt by lodging and wet weather. *Oats*—Very heavy crop, especially in straw, but spoilt by bad weather. *Harvest*—Started at normal time, but very bad weather in the first fortnight made harvesting very difficult and late. *Hay*—Good, and secured in good weather and condition ; 2 to 3 tons per acre. *Meadow Hay*—None grown. *Potatoes*—Good crop, 8 to 10 tons per acre ; slight occurrence of blight. *Turnips*—About average ; 25 to 30 tons per acre ; braided well ; very little resowing. *Insects*—Injury not specially marked. *Weeds*—Came away late in green crops, and were troublesome ; couch grass gave some trouble also. *Pastures*—Were very small, but good. *Live Stock*—Throve well, and all free from disease. *Clip of Wool*—Average.

FIFESHIRE (Western). *Wheat*—Record acreage sown under ideal conditions ; yield considerably reduced by effects of rust ; some was sown on higher, poorer farms with disappointing results ; average, 40 bushels per acre. *Barley*—Rather more grown than last year ; crop satisfactory and samples good ; yield, 35 to 40 bushels per acre ; seed sown, 2 to 4 bushels per acre. *Oats*—Increased acreage sown ; average 40 to 48 bushels per acre ; as in last year a larger proportion of straw than usual ; samples very light, 36 to 40 lb. per bushel ; seed sown, 5 to 7 bushels per acre. *Harvest*—Began third week in August ; heavy and layed crops, combined with broken weather, considerably lengthened operations ; a small proportion of crop in later districts severely damaged. *Hay*—Average crop, 35 cwt. per acre ; quality generally good. *Meadow Hay*—Average crop, but not well got. *Potatoes*—Average yield 6 to 8 tons per acre ; blight appeared in August in some areas, and, where prevalent, tubers did not keep well in pits ; no new varieties planted. *Turnips*—Braided well ;

early sown generally a good sound crop; little insect damage; in late districts disappointing, and in some cases failures owing to wet weather; yield, 16 to 18 tons per acre. *Insects*—Some wheat bulb fly, grub, and slug damage, possibly owing to mild winter. *Weeds*—Again prevalent, especially redshank; not easily kept under control owing to wet weather and labour shortage, especially among green crops. *Pastures*—Growth above average throughout the season. *Live Stock*—All thrive well during early months, but, in spite of abundant grass, condition of cattle at end of season disappointing; all classes comparatively free from disease. *Clip of Wool*—Crop above average; quality good.

PERTHSHIRE (Eastern). *Wheat*—Winter wheat a good crop; 40 to 50 bushels per acre; seed sown, 4 to 5 bushels, English seed 3 bushels per acre; samples only fair; some sprouting in the stook owing to bad harvest weather. *Barley*—Varied somewhat, from good to moderate only, according to land; more than usual grown owing to Government requirements; seed sown, 3 to 3½ bushels per acre; samples only fair. *Oats*—Good return, but samples were a little coloured and rather light in bushel weight owing to lack of sunshine; threshed well; 42 to 68 bushels per acre; seed sown, 4 to 6 bushels per acre. *Harvest*—Began about usual time, but some wheat sown very early, and cut in July, tended to sprout owing to very broken and mild weather during August and September; harvest finished about the end of September. *Hay*—An average crop, about 40 to 50 cwt. per acre; secured in good order. *Meadow Hay*—Good, but secured in only fair condition; much the same quantity as last year. *Potatoes*—Not so good as last year; 5 to 9 tons per acre; some blight among the earlies; kept only moderately in the pits, especially early varieties, which had a little disease when pitted; some sprouted in the pits owing to the very mild weather; very few new varieties grown. *Turnips*—A good crop, but not up to last year's; owing to the exceptionally mild weather grew considerably in November and December; 25 to 30 tons per acre; braided very well; practically no resowing. *Insects*—No damage reported. *Weeds*—Caused no injury, but crops were not well cleaned owing to the scarcity of labour and cross-cropping under Government requirements. *Pastures*—Grass came away well and gave a good grazing season. *Live Stock*—Did well, but still a few cases of trouble with half-bred ewes before lambing; mild autumn; grass was green and fresh until New Year; cattle and sheep were free from disease, except for a few cases of anthrax. *Clip of Wool*—Above average; good quality.

PERTHSHIRE (Western). *Wheat*—Area sown similar to last year; good average crop; yield of grain not up to average, especially where wheat followed wheat; 30 to 35 bushels per acre; straw, 20 to 25 cwt. per acre; seed sown, 4 bushels per acre; rust very bad in some fields—the worst affection for many years. *Barley*—Not up to average; much of it on good land was badly laid, difficult to harvest and consequently lost. *Oats*—Good yield, 40 to 50 bushels per acre, with new varieties higher; straw better than last year; seed sown, 5 to 7 bushels per acre. *Harvest*—Began about usual time, middle of August; better conditions than last year, especially towards end of September; general labour shortage delayed the finish. *Hay*—Timothy, a heavy crop; 70 to 90 cwt. per acre, green cut, secured in fair order; not much suitable for seeding; yield of seed very poor, average 3 cwt. per acre; ryegrass good crop with abundance of clover; 35 cwt. per acre on drifield, 60 cwt. per acre on carse. *Meadow Hay*—Average crop; not very well secured. *Potatoes*—Under average crop; 6 to 8 tons per acre; not much disease; many fields lifted in wet condition. *Turnips*—Not up to average; many sown

too late owing to wet weather, and very few sown in carse for this reason ; some crops very poor ; average, 25 to 30 tons per acre. *Insects*—Not much damage. *Weeds*—Very abundant, especially in green crops, and, owing to lack of labour, in some cases got the upper hand. *Pastures*—Up to average ; grazing season lasted longer than usual. *Live Stock*—Did well ; cattle and sheep were free from disease. *Clip of Wool*—Average quality ; weight better than last year.

PERTHSHIRE (Highland). *Wheat*—Not generally sown ; only a few acres on favoured farms. *Barley*—A good crop ; more sown than usual ; about 40 bushels per acre ; seed sown, 4 bushels per acre. *Oats*—Increased acreage sown ; straw, of good bulk and quality ; natural weight of grain about 42 lb. per bushel ; seed sown, 6 to 8 bushels per acre, according to variety. *Harvest*—Began in the first week of September, and, in most cases, was completed within a month under fine weather conditions. *Hay*—Crop average, of good quality, and well secured ; 35 cwt. per acre. *Meadow Hay*—Not very much now grown ; an average crop. *Potatoes*—Larger acreage than usual planted, and a good crop secured under generally favourable conditions, notwithstanding shortage of labour ; average, about 8 tons per acre ; little disease ; no new varieties grown. *Turnips*—Under average, 17 tons per acre ; braided well ; no second sowing required. *Insects*—No damage recorded. *Weeds*—Very few, and where evident were easily kept under control. *Pastures*—A good grazing season which lasted well into autumn. *Live Stock*—Throve well ; cattle and sheep free from disease ; several isolated cases of grass sickness amongst horses. *Clip of Wool*—Good quality, and about an average crop.

ABERDEEN DISTRICT.

ANGUS (Western). *Wheat*—40 bushels per acre ; straw and grain, good quality ; seed sown, 3 to 4 bushels per acre drilled. *Barley*—48 bushels per acre ; straw and grain, good quality ; seed sown, 2½ to 4 bushels per acre drilled ; some crops threshed out at 72 bushels per acre from stook. *Oats*—56 bushels per acre ; straw and grain, good quality, but not up to last year because of bad weather in harvest ; seed sown, 4 to 6 bushels per acre according to variety and district. *Harvest*—Started second week of August in broken weather for first three weeks, but conditions improved and leading was carried out in good weather. *Hay*—35 cwt. per acre ; quality only fair because of weather. *Meadow Hay*—None grown. *Potatoes*—7 tons per acre ; no disease to speak of ; crops generally burned with acid before lifting, and very few broke when dressing ; no new varieties tried ; no frost damage. *Turnips*—22 tons per acre ; mostly sound ; good braid ; no resowing reported ; kale and cabbage were more grown, both crops being good. *Insects*—Crops damaged no more than usual. *Weeds*—No damage recorded. *Pastures*—Average in growth and quality. *Live Stock*—Throve well ; cattle and sheep were free from disease. *Clip of Wool*—Of good quality, and over average crop.

ANGUS (Eastern). *Wheat*—Good ; 44 to 52 bushels per acre ; straw, heavier than last year, but in August was spoiled by weather, and crops got over-ripe through delayed harvesting ; same varieties developed slight rust, but generally the sample was very good, weighing up to 63 lb. per bushel ; seed sown, 3½ to 4 bushels per acre. *Barley*—On good land very satisfactory ; up to 64 bushels per acre ; colour good ; on poor land short of lime yield only fair ; seed sown, 3½ bushels per acre. *Oats*—Good heavy crop with rather much straw, but got in good order ; grain well filled and

of good quality, but did not thresh out so well as under pre-war conditions of rotation; 80 to 88 bushels per acre off good land; seed sown, 4 to 6 bushels per acre according to variety. *Harvest*—Began at usual time or rather earlier, about second week of August; but increased acreages, one-way cutting, and labour shortage extended the time of cutting unduly. *Hay*—A better crop than last year, with good clover; saved in first-rate condition with the minimum of labour; 3 to 3½ tons per acre on well-farmed land. *Meadow Hay*—Not grown. *Potatoes*—Very good crop; at least 10 tons per acre, 2 tons per acre more than last year; practically no disease. *Turnips*—Heaviest crop for some years; 25 to 30 tons per acre; sound and of good quality; braided well and grew till far into December; very little second sowing. *Insects*—No injury reported. *Weeds*—No injury to grain, but green crops were somewhat affected owing to shortage of labour. *Pastures*—Grew very well all season and kept fresh and plentiful far into late autumn. *Live Stock*—Did very well and kept free from disease. *Clip of Wool*—Good; quality and quantity better than last year.

KINCARDINESHIRE. *Wheat*—34 bushels per acre; grain and straw good quality; seed sown, 3 to 4 bushels, drilled. *Barley*—42 bushels per acre; grain and straw good quality, and threshed well; seed sown, drilled, 3 to 4 bushels per acre. *Oats*—52 bushels per acre; grain and straw good quality, and threshed well; seed sown, 4 to 8 bushels per acre. *Harvest*—Early; started in third week of August and finished in first week of October. *Hay*—A good crop; 2 tons per acre. *Meadow Hay*—None grown. *Potatoes*—Very good crop; 8½ tons per acre. *Turnips*—16 tons per acre; quality good, but not heavy; made quite a good start, but suffered from drought in July. *Insects*—No damage done. *Weeds*—No injury reported. *Pastures*—During the season were well above average growth. *Live Stock*—Grazed well and made fully average progress; there was no complaint of disease. *Clip of Wool*—Average.

ABERDEENSHIRE (Buchan). *Wheat*—Very little grown, and with not much success; seed sown, 4 bushels per acre. *Barley*—40 to 48 bushels per acre; 64 bushels per acre on the best barley land; good quality; seed sown, 3 to 4 bushels per acre. *Oats*—Average crop, from 40 to 80 bushels per acre; good quality; straw, very good quality; quantity of grain depended on variety and district, larger varieties giving most, but not so much straw; seed sown, 4 to 8 bushels per acre according to variety. *Harvest*—Began about middle of August. *Hay*—Good quality; 30 to 40 cwt. per acre. *Meadow Hay*—None grown. *Potatoes*—Splendid crop; no disease; 8 to 10 tons per acre. *Turnips*—Good crop; better quality than last year; 12 to 20 tons per acre; braided well, but in some cases fly destroyed the first braid. *Insects*—No extensive injury. *Weeds*—Greater damage than usual. *Pastures*—Average in growth and quality. *Live Stock*—Throve well, and cattle and sheep were free from disease. *Clip of Wool*—Average crop and quality.

ABERDEENSHIRE (Central). *Wheat*—34 bushels per acre; quality good; seed sown, 3 to 4 bushels per acre. *Barley*—46 bushels per acre; quality very good; seed sown, 3 to 4 bushels per acre. *Oats*—50 bushels per acre; seed sown, 5 to 6 bushels per acre, according to variety. *Harvest*—Began about the usual time. *Hay*—Clover, 20 to 24 cwt. per acre; ryegrass, 18 cwt. per acre; quality a good average. *Meadow Hay*—Very similar to last season. *Potatoes*—6½ tons per acre; very little disease; what there was became apparent about the first week of September; no new varieties planted. *Turnips*—16 tons per acre; braiding good; very little sown a

second time. *Insects*—No damage done. *Weeds*—Damage similar to last year. *Pastures*—Average growth; quality good. *Live Stock*—Did very well; cattle and sheep were free from disease. *Clip of Wool*—Average.

ABERDEENSHIRE (Strathbogie). *Wheat*—None grown. *Barley*—Acreage above average and crops good; 26 to 50 bushels per acre, weighing 53 to 56 lb. per bushel; seed sown, 4 bushels per acre. *Oats*—Crops possibly better than in 1942, and very well harvested; yield above average, but varied substantially according to district; 48 to 58 bushels per acre, weighing 40 to 45 lb. per bushel. *Harvest*—Crops were well harvested, and there was an abundant supply of straw of good quality, of which extra cropping gave a superfluity. *Hay*—Not much grown, and only for local use. *Meadow Hay*—None grown. *Potatoes*—Quality good and quantity above average; no new varieties grown; staple crops, Kerr's Pink and Golden Wonder. *Turnips*—Satisfactory, and no resowing was necessary. *Insects*—No trouble recorded. *Weeds*—Little trouble, as weather favourable for cleaning the land; absence of skilled labour, however, very marked. *Pastures*—Abundant; lasted well into the autumn. *Live Stock*—Appeared to be on the decrease owing to feeding-stuff rationing difficulties; cattle and sheep were free from disease. *Clip of Wool*—Quality good and quantity average. *General Remarks*—A very good spring and weather favourable for harvesting even in late districts; dry conditions made resowing not uncommon; grass and pastures were extremely good.

BANFFSHIRE (Lower). *Wheat*—None grown. *Barley*—Very fine crop, well harvested; on many farms, 36 to 38 cwt. per acre, natural weight 56 to 58 lb. per bushel; straw, 20 to 22 cwt. per acre; seed sown, 4 bushels per acre. *Oats*—Average crop; 50 to 56 bushels per acre; straw of good quality, 25 to 28 cwt. per acre; seed sown, 6 to 7 bushels per acre. *Harvest*—Began on 10th August, a few days earlier than usual, and finished on 13th September. *Hay*—Better than last year; 30 to 40 cwt. per acre; clovers more plentiful than usual. *Meadow Hay*—Practically none grown. *Potatoes*—Yield less than last year, about 6 to 8 tons per acre; slight attacks of blight in a few cases among early varieties towards end of July; no new varieties planted. *Turnips*—Average crop of good quality; about 18 tons per acre; braided well, there being no second sowing. *Insects*—No damage recorded. *Weeds*—No injury done, but with the extra cropping weeds, such as knot-grass and yarrow, or yarr, were more prevalent than formerly. *Pastures*—Fully better than last year, particularly during later part of grazing season. *Live Stock*—Progress of all was satisfactory during the grazing season; cattle and sheep were free from disease. *Clip of Wool*—Fully above average and of good quality.

BANFFSHIRE (Upper). *Wheat*—None grown. *Barley*—Good return in most districts, and nearly all bought by Ministry of Food; the standard weight was fully maintained in earlier districts; average per acre, 35 to 40 bushels; seed sown, from 4 to 5 bushels per acre. *Oats*—Over all a good average return, some fields very good; average, 40 to 50 bushels per acre; Government cutting plant was great benefit to many; seed sown, 5 to 8 bushels per acre; standard weight was general. *Harvest*—Generally started earlier than usual, many districts about last week in August; weather was not good at first, and in many districts harvesting was still in progress in October. *Hay*—About average, some districts light owing to dry weather early; average, 2 tons per acre; quality generally good. *Meadow Hay*—None grown. *Potatoes*—Good crop generally; about 4 to 6 tons per acre, and healthy; principal variety

Kerr's Pink. *Turnips*—Good crop in most districts; quality very good; return, 16 to 20 tons per acre; no difficulty with brairding; no second sowing. *Insects*—No damage worth reporting. *Weeds*—Some fields were badly affected, but weather was good for cleaning; knot grass and stringy weeds troublesome. *Pastures*—About average growth, and quality. *Live Stock*—Generally did well on pasture; no disease amongst cattle or sheep. *Clip of Wool*—About average return, and quality good.

INVERNESS DISTRICT.

MORAYSHIRE. *Wheat*—There were reports of disease such as 'take-all' in some crops, otherwise a good return; 45 bushels per acre; straw, 35 cwt. per acre, both good quality; seed sown, 4 bushels per acre. *Barley*—A good crop, 37 bushels per acre, weighing 53 to 56 lb. per bushel; straw, good quality, 24 cwt. per acre; seed sown, 3 to 4 bushels per acre. *Oats*—Good crop, rather better than last year, but quality not quite so good; from 80 bushels per acre on good soils to 30 to 40 bushels per acre on the uplands; seed sown, 4 to 7 bushels per acre. *Harvest*—Was four to five days later than last year. *Hay*—In many cases was rather thin on the ground, about 2 tons per acre; well secured and of good quality. *Meadow Hay*—Very little grown. *Potatoes*—Better crop than last year; 9 tons per acre; very good quality; no new varieties. *Turnips*—A good average crop; 20 to 35 tons per acre, according to soil and conditions; little second sowing; crop healthy and kept well. *Insects*—No damage reported. *Weeds*—Some injury; turnip fields were dirtier than formerly; couch, redshank, fat hen, &c., troublesome. *Pastures*—Grew well throughout the season. *Live Stock*—Did very well; no disease among cattle and sheep. *Clip of Wool*—Average crop in quality and weight.

NAIRNSHIRE. *Wheat*—Little grown. *Barley*—Similar to last year; about 36 bushels per acre. *Oats*—About 48 bushels per acre. *Harvest*—Began at usual time. *Hay*—Rather better than last year, about 25 cwt. per acre. *Meadow Hay*—None grown. *Potatoes*—About 8 tons per acre; no disease. *Turnips*—Very much below average. *Insects*—No injury recorded. *Weeds*—No damage caused. *Pastures*—Excellent growth and quality. *Live Stock*—Did well; cattle and sheep were free from disease. *Clip of Wool*—Average.

INVERNESS-SHIRE (Inverness). *Wheat*—Same as last season's return. *Barley*—30 bushels per acre. *Oats*—Same as last year. *Harvest*—Began a week earlier than usual. *Hay*—Average crop. *Meadow Hay*—Same as in previous season. *Potatoes*—5½ tons per acre; no disease of any account. *Turnips*—Good crop; brairded well. *Insects*—No injury to report. *Weeds*—Increased damage owing to shortage of labour. *Pastures*—Average growth and quality. *Live Stock*—Did well; cattle and sheep were free from disease. *Clip of Wool*—Weight above average owing to open winter.

INVERNESS-SHIRE (Skye). *Wheat*—None grown. *Barley*—None grown. *Oats*—Much grain was secured in weathered condition, but where favourably got the grain and straw were better than average in quantity and quality. *Harvest*—Commenced about the usual time, but was prolonged, and was one of the worst experienced; 13 inches of rain were recorded in October, the principal harvest month. *Hay*—Ryegrass heavier than average; quality good. *Meadow Hay*—Difficult to secure in autumn; yield did

not greatly differ from previous year. *Potatoes*—Very variable; some districts have not had better crops in size, bulk, and quality, in others the size was small; the incidence of blight not so extensive as in 1942, but rotting on account of wet weather was very extensive. *Turnips*—Not extensively grown. *Insects*—No injury of note to report. *Weeds*—Damage was greater than usual. *Pastures*—Fully as good as average and more productive than in 1942. *Live Stock*—Throve well both as regards cattle and sheep; some incidence of trembling in cattle caused deaths in some localities. *Clip of Wool*—Weight was well up to average, and improved upon the past two or three years.

INVERNESS-SHIRE (Lochaber). *Wheat*—None grown. *Barley*—None grown. *Oats*—Light all over owing to wet, cold weather, and crops secured in very bad condition and some entirely lost. *Harvest*—Later than usual owing to shortage of labour in the spring retarding sowing. *Hay*—Just under average. *Meadow Hay*—Under average. *Potatoes*—Much under average and in some cases the crop was less than half the usual. *Turnips*—Very few sown owing to wet weather in June, and ground was never in proper order. *Insects*—Did not cause damage. *Weeds*—Could not be kept down owing to want of labour. *Pastures*—Average. *Live Stock*—Quite healthy, but did not get into the same condition as usual; cattle and sheep were very free from disease. *Clip of Wool*—A little under average.

ROSS-SHIRE (Dingwall and Munlochy). *Wheat*—Larger acreage grown; a good crop, up to average; straw bulked well; seed sown, 3 to 4 bushels per acre; yield over 24 cwt. per acre on the best land. *Barley*—Larger acreage grown; a good crop; large bulk of straw; seed sown, 2 to 4 bushels per acre; yield, 32 to 52 cwt. per acre. *Oats*—With extra wheat and barley acreage probably not as much grown; an average crop, but yield per acre barely as good as last year. *Harvest*—Prolonged owing to weather and scarcity of labour. *Hay*—A good crop, but less grown; generally well got; yield over 2 tons per acre on the best land. *Meadow Hay*—None grown. *Potatoes*—Larger acreage grown; yield better than the average; 8 to 12 tons per acre. *Turnips*—Crop lighter than last year; no resowing. *Insects*—No report. *Weeds*—Annuals began to get the upper hand owing to scarcity of labour; unmowed roadsides were responsible for spreading weeds over arable ground in many cases. *Pastures*—Average growth. *Live Stock*—Throve well; cattle and sheep have been free from disease. *Clip of Wool*—Average.

ROSS-SHIRE (Tain, Cromarty, and Invergordon). *Wheat*—Fair crop; spring wheat not good. *Barley*—On fair land, 48 to 50 bushels per acre. *Oats*—On good land, 64 bushels per acre; not much lodged. Intensive cropping programme is having very serious effect on crops and grass. *Harvest*—Two weeks later than previous year. *Hay*—Fair crop; well secured. *Meadow Hay*—None grown. *Potatoes*—6 to 8 tons per acre; usual well-known varieties; little blight. *Turnips*—Quite good where sown early. *Insects*—Not much damage generally. *Weeds*—Trouble increasing yearly owing to labour shortage and war programme. *Pastures*—Grazed fairly well. *Live Stock*—Healthy on the whole; cattle and sheep kept free from disease. *Clip of Wool*—Good.

SUTHERLANDSHIRE. *Wheat*—Only one field grown; 30 bushels per acre; straw, 18 cwt. per acre; seed sown, about 5 bushels per acre; a fair crop; grain and straw of good quality. *Barley*—36 bushels per acre; straw, 18 cwt. per acre; seed sown, about 4 bushels per acre; grain and straw good. *Oats*—38 bushels per acre; straw, 20 cwt. per acre; seed sown,

about 4 bushels per acre ; a very good crop, and mostly secured in good condition, except on high, late farms. *Harvest*—Began about a week earlier than usual on early farms. *Hay*—About 18 cwt. per acre ; quality very good, similar to last year, both ryegrass and clover. *Meadow Hay*—Much the same as last year ; about 18 cwt. per acre, but quality suffered badly from wet weather. *Potatoes*—Rather better than in 1942 ; average, slightly over 4 tons per acre ; no disease ; quality good. *Turnips*—12 to 16 tons per acre ; quality not so good as last year ; hard frost with very little snow-protection spoilt much produce during the winter months ; brairded very well, but after singling very wet weather spoilt growth. *Insects*—Very little damage ; injury by turnip-fly negligible. *Weeds*—The usual crop of thistles, but generally less damage than usual. *Pastures*—Of average growth and quality ; they improved later in the season. *Live Stock*—Both cattle and sheep summered very well ; kept very free from disease, and maggot-fly was less troublesome than in previous years. *Clip of Wool*—Very good, and well over the average.

CAITHNESS-SHIRE. *Wheat*—Acreage slightly increased ; crops fair and of good quality ; average, 40 bushels per acre ; seed sown, 4 bushels per acre. *Barley*—Larger acreage grown than last year ; crops of good quality ; 36 bushels per acre ; seed sown, 4 bushels per acre. *Oats*—Better crop than last year ; grain and straw good quality, and secured in good condition ; threshed out better than previous year ; 50 to 56 bushels per acre ; straw, 2 tons per acre ; seed sown, 4 to 6 bushels per acre. *Harvest*—Began at the usual time ; many fields cut in the last week of August. *Hay*—Average crop ; rather better quality than last year ; 2 to 3 tons per acre. *Meadow Hay*—Similar to last year ; rather better quality. *Potatoes*—An abundant crop ; 5 to 7 tons per acre ; tubers big and dry ; not much evidence of disease ; not many new varieties planted. *Turnips*—Average ; 25 to 28 tons per acre ; brairded well ; no resowing necessary. *Insects*—No damage reported. *Weeds*—Charlock and thistles the most prevalent weeds ; damage not much greater than usual. *Pastures*—Were of average growth and quality. *Live Stock*—All classes thrive and made good progress on pasture ; cattle and sheep practically free from disease ; some sheep attacked by maggot-fly. *Clip of Wool*—Average, and of good quality.

ORKNEY. *Wheat*—None grown. *Barley*—Grain, 30 to 40 bushels per acre ; straw, 25 to 30 cwt. per acre ; seed sown, 3 to 3½ bushels per acre. *Oats*—Grain, 30 to 60 bushels per acre ; straw, 20 to 35 cwt. per acre ; seed sown, 4 to 5 bushels per acre, with an increase of 2 to 3 bushels where large-grained varieties were used. *Harvest*—Started about first week of September, a little later than last year ; weather mostly good, and a particularly dry spell in October allowed the crop to be gathered in good order. *Hay*—Average ; 30 to 40 cwt. per acre. *Meadow Hay*—About average. *Potatoes*—Crop about average, varying from 6 to 10 tons per acre ; attacks by disease were slight. *Turnips*—Crop in many districts slightly below average ; very few cases reported of second sowing. *Insects*—No serious damage reported. *Weeds*—No serious damage ; charlock common in oats in some districts. *Pastures*—Of average growth and quality. *Live Stock*—Made satisfactory progress ; cattle and sheep were free from disease. *Clip of Wool*—Average.

SHETLAND. *Wheat*—None. *Bere*—13 to 14 cwt. per acre ; quality of grain and straw very much superior to those of last year ; seed sown, 2 to 3 bushels per acre. *Oats*—9 to 10 cwt. per acre ; quality of grain and straw superior to last year's ; seed sown, 4 to 6 bushels per acre. *Harvest*—Commenced slightly earlier than usual. *Hay*—Averaged about 14 to 15

cwt. per acre ; lower than normal due to bad harvest weather in previous autumn and to severe winter gales. *Meadow Hay*—Yield average. *Potatoes*—Average, 5½ tons per acre, being slightly better than last year ; quality, good ; no serious attacks of disease ; no new varieties planted. *Turnips*—Average, 13 tons per acre ; quality, good ; brairded fairly well ; second sowing not required. *Insects*—Damage by grub in oats appeared to be more extensive than usual ; attacks by cabbage root fly fairly widespread. *Weeds*—Charlock in oats fairly prevalent, and also spurrey and shepherd's purse. *Pastures*—Good ; fairly long growing season ; rather above average. *Live Stock*—Generally thrive very well ; little disease among cattle and sheep. *Clip of Wool*—Quality good ; yield average.

THE WEATHER OF SCOTLAND IN 1943.

By W. A. HARWOOD, D.Sc., F.R.S.E.

THIS report consists of (1) a general description of the weather from month to month, and (2) a selection of rainfall returns in which each county of Scotland is represented by one or more stations. Temperature readings, unless otherwise stated, are from thermometers exposed in the regulation "Stevenson Screen."

JANUARY.

After a succession of three very cold Januarys 1943 brought a nearly normal one. The month was mainly wet and dull with frequent rather than heavy rain and snow. The weather was cold in the first part of the month, especially from the 4th to the 9th; the latter part, however, was mild. Mean temperature was mainly rather below the average. During the cold spell there was frost at several places throughout the days 4th, 5th and 8th, and Braemar had 25 degrees of frost (7° F.) in the screen on the night of the 4th-5th. Ground frost occurred on every night except two, the most intense giving temperatures of 4° F. on the 5th and 3° F. on the 8th at Braemar. The last week (especially 28th-29th) brought milder weather, and temperatures of 50° F. or more were experienced in most districts. The highest temperature reported was 55° F. at Cupar on the 29th.

Rain and snow were frequent rather than heavy. Many places had 24 or 25 wet days, and in Colonsay the number reached 29. A line roughly from the Firth of Lorne to Kinnaird Head separated an area to the north with deficient falls from a southern area which had more than the average. The Moray Firth region was driest. There, Nairn had only 0.9 inch—*i.e.*, 46 per cent of its normal amount. On the other hand, near the Firth of Tay a few places had double their average. Snow fell in one place or another on 24 days, and was widespread but not heavy at the beginning and the end of the month.

Weather was dull except round the Moray Firth and in the extreme north-west. In the Clyde area the totals of bright sunshine were about 20 hours less than usual, and Glasgow reported only 7 hours. The largest amount was 57 hours at Forres. There was much fog, the only free days being 17th, 25th, and 30th.

FEBRUARY.

In the preceding year 1942 this month was the coldest of the winter and the coldest February since 1900. In 1943 by contrast it was the mildest February for 40 years. Weather in the west and north-west was very wet and dull, whereas in the east it was dry and very sunny. There were severe gales in the west and north.

The mean temperature for the whole country was about 4 degrees above average and 9 degrees above that of February 1942. There was some cold weather in the first week, slight frosts being experienced rather generally. From about the 8th, however, mild conditions prevailed by both day and night. During the cold spell Tarland reported 23° F. Ground frost was quite frequent, but not severe, the lowest reading being 15° F. on the 7th at Dunfermline. The warmest spell was in the last week. Other days in the month, however, also had temperatures well above 50° F. The highest temperature reported was 63 at Stonehaven on the 27th.

The month was persistently wet in the west, many places having rain every day. Over the eastern area, however, precipitation (including rain and snow) was light and confined to the first half of the month, if we except a single rainy day on the 24th. In parts of West Inverness and Sutherland totals reached double the average, while along the east coast they were only from a half to two-thirds of the average. Light snowfall was reported from one place or another on 20 days, but at no time was there more than 2 inches of level snow lying.

There were great contrasts in sunshine. Departures from normal ranged from minus 34 hours to over plus 40. Stornoway with only 21 hours had its dullest February since commencing observations over 60 years ago, whereas stations in Angus and Fife recorded their greatest February totals since commencing observations. Arbroath was the most favoured place, its total being 124 hours.

MARCH.

March was dry on the whole. It was also mild, but not so outstandingly mild as February. Weather was rather dull in the centre and west and bright elsewhere. There were severe gales towards the end of the month.

Mean temperature was above normal, the excess for the country as a whole being 3.3 degrees. On the 1st, 2nd, 6th, and from the 16th to the 18th day temperature reached 60 in many parts. Perth reported 63 on the 6th. Conditions were cold from the 12th to the 15th and on the 22nd, low readings being 22 degrees (10 of frost) at Peebles on the 12th and 21 degrees at Braemar on the 22nd. Ground frosts were reported on 28 nights, the most severe giving 20 degrees of frost at Dumfries on the 15th.

The total rainfall was about normal in parts of Argyll, Inverness, and Sutherland, but most of the country had less rain than usual.

There was a wet period from 7th to 17th in the north and west. Another during the last week gave most of the rain in other areas. The shortage of rain was most marked in the Borders and along the coast from Aberdeen to the Forth. Some stations in these parts had only about a quarter of their usual amount, and Aberdeen experienced a drought from 1st to 24th, completing a period of 37 days with a total of only 0·06 inch. Dundee in the same period had 17 days' drought up to 14th March and Dunbar 20 days up to the 16th. Snow was reported on 14 days. It was fairly widespread on 11th, 12th, and 13th, but was nowhere heavy.

Sunshine exceeded the average over an area including all the country south of the Forth-Clyde belt, and also at some places in the north. The 12th, 14th, and 22nd were specially bright days on which over 10 hours' sunshine was recorded at such places as Nairn, Edinburgh, and Kilmarnock. Nairn had a total of 135 hours for the month—*i.e.*, 20 hours above normal. In the centre and west on the other hand, some totals were in the neighbourhood of 80 hours—*i.e.*, 20 or more hours below normal.

APRIL.

April surpassed even February in mildness, being the mildest April on record. It was also a month of gales. There was much rain and little sunshine at most places in the west, contrasted against sunny and relatively dry weather along the east coast.

For the country as a whole the mean temperature was 4·6 degrees above the average. At individual places in the east the excess was over 6 degrees. Specially mild days had temperatures well above 60, and North Berwick reached 66 on the 21st. There were, however, some slight frosts about the 6th-8th and the 29th, a number of stations reporting temperatures down to 26 degrees. Ground frosts occurred on 21 nights, and some were fairly widespread. That of the 29th gave readings of 19 degrees at Balmoral and West Linton.

The month's rainfall exceeded the average except in east coast districts and in parts of the south-west. Much of the Western Highlands had more than double the usual amount, and some places, for example, Fort William and Onich, had only two days without rain in the whole month. At Fort William it was the wettest April since 1904. Kinlochquoich totalled 17·72 inches, and had over an inch on nine separate days. In the dry area of the east, on the other hand, there were numerous places with less than one inch during the whole month. Coldstream had only ·75 inch, North Berwick ·81, and Edinburgh 1·00. Snow was reported on nine days, chiefly from 5th to 7th. The falls were light.

There was abundant sunshine along the east coast and in the south, but the Hebrides and the central area had less than usual. During the third week many places recorded 10 hours a day or more, and on the 18th and 19th some stations had over 12 hours.

The highest total was 184 hours at Kirkcaldy. On the other hand, Oban, with only 64 hours, had its dullest April on record.

The month as a whole was unusually stormy with gales on 18 days. There was a very severe one on the 6th; this was most exceptional in the south, gusts exceeding 90 miles per hour there. Much damage was done in western districts.

MAY.

May was a mixed month. It included exceptional cold, exceptional warmth, and also stormy weather with one of the severest snowstorms on record for this time of year. It was wet in most parts.

There was an exceptionally cold spell, with much snow, from the 7th to the 11th, which gave sharp frosts at many stations. On the 10th Braemar had 6 degrees of frost. A week later, from the 17th to the 20th, temperatures rose much above 70 degrees at many places. Kilmarnock had 78 degrees on the 18th. Ground frosts occurred on 20 nights. The most severe, on 10th-11th, gave 14 degrees of frost at Balmoral.

Precipitation in the form of rain and snow was well above average in most parts, and in the east and south a few places had more than double their average. Some scattered stations in the west, however, had less than usual. The periods of heaviest precipitation were 6th-13th, 22nd-26th, and 29th-31st. Snow was reported on each day from the 5th to the 12th. During the week-end 8th-10th snowfall was widespread, and in many places very heavy. Even the lesser isles of the Minch were covered. The storm was specially severe in Aberdeenshire, where roads were blocked, and there were casualties among sheep and cattle.

There were gales on ten days, and a northerly gale brought the heavy snowfall of the 8th-9th. Much damage to fruit was caused by wind and frost.

Sunshine was above normal for the month as a whole in the south and east, but below it in the north and west. In the Border country and the Lothians there were numerous totals exceeding 210 hours, Dumfries with 218 hours heading the list. Farther north the totals ranged down to 143 at Onich.

JUNE.

The unsettled weather of May extended into June, but the outstanding feature of the month was a very fine warm spell in the latter part.

Temperatures remained rather low in most places until the third week. They then rose well above normal, and the last five days were exceptionally warm. This warm spell brought the mean for the country as a whole above the average. In the Clyde area and Argyll readings of over 80 degrees were reported by several stations. The highest was 84 in Glasgow on the 29th. The

eastern districts had temperatures between 70 and 80 at this time. During the early part of the month the coolest periods were 4th to 7th and 16th to 18th. Night temperature was below 40 at many places in both periods, and several places reported readings of 34 and 35. Slight ground frosts occurred on 10 nights, the lowest readings being 28 degrees at Onich and 29 at Kirkwall on the 16th.

There was rain in most parts until the 24th, and totals were well above average in most areas. In Argyll and Inverness some stations had more than double the average. Nevertheless, somewhat less than usual fell in Shetland, Orkney, parts of the north-east, and some places in the south-east.

The amount of sunshine was in general about normal. In Shetland, the Hebrides, and parts of the Great Glen the weather, however, was dull, the totals there being 40 to 60 hours less than usual. The period 26th-30th was brilliant everywhere, and on both the 29th and 30th several places had more than 16 hours' sunshine. The largest total was 221 at Arbroath and the smallest, 98, at Onich.

JULY.

This was a more than usually sunny and dry month, but not a record-making one in any way. It ended in a short-lived thundery spell and the hottest day of the year.

The mean temperature of the country for the whole month was about normal, only a few places on the east coast and in the Borders having mean temperatures between one and two degrees below their average. This was by no means due to equable weather, however. Cool conditions in the first half of the month gave place to variable but mainly warmer ones in the second half, and these culminated in a really hot day on the 31st. The coolest days occurred from 7th to 10th and on the 17th, 18th, and 23rd, Braemar having a screen temperature only two degrees above freezing-point on the morning of the 17th. Ground frosts were recorded on eight nights, mostly at high levels. During the warmer period, readings exceeded 70 degrees on several days, and day temperature in Glasgow reached 79 on the 24th. Subsequently, however, on the 31st, North Berwick and Dunbar had 88. On this day most of the country south of Fort William and Gordon Castle experienced temperatures of over 80 degrees.

For most of the country the month was rather dry, but owing to the thunder rains of the last two days some places reached their averages. The thunder area extended over some of the Islands, and totals in the outer Islands were above average. There was a rainless spell from 16th to 24th, and the first two days of the month were also rainless.

Sunshine was abundant everywhere. Many places had more sunshine than in either May or June, which is unusual. During the dry spell Turnberry averaged nearly 14 hours a day, and headed the list of totals in the month with 239 hours. There were only five stations with less than 160 hours.

AUGUST.

In contrast to July this month was dull, cool, and very wet over practically the whole country. In the west many places had rain every day, and even in the east there were only five or six days without rain. Thunderstorms were exceptionally numerous.

Mean temperature was below average everywhere. Several days were very cool, and the only warm days were the 1st, 7th, and 20th. On the warmest day—namely, the 1st—Oban reported a temperature of 77 degrees. The coolest days were the 3rd and the 10th, with temperatures well below 60 generally. The coolest nights occurred in the last week, and night temperatures below 40 were widespread from 27th to 29th. Braemar reported 31 degrees on the 27th. Ground frosts occurred on 8 nights, the most intense of these giving temperatures of 25 inland and 26 even at coast stations.

The total rainfall was considerably above average in most places, and at some it was exceptional. In general, however, the falls were frequent rather than heavy, and a few scattered places had somewhat less than usual. Glasgow and Inverness were among the exceptionally wet stations. Both received about double their average amounts. At Glasgow there was only one day without rain, and it was the wettest August for fifty years. Perth had its wettest August for twenty-two years. Thunder was reported on 19 days.

The sunniest area during the month was Shetland. There, Lerwick had a total of 152 hours, or 35 hours more than usual. Places on the east coast and also Tiree in the west had figures between 125 and 140. Many parts had less than 100 hours, among them the Clyde and the Caledonian Canal, where the totals were about 40 hours below normal.

SEPTEMBER.

The month was unsettled, but not so wet as August. Exceptionally heavy falls on the 27th, however, caused some floods and damage in Morayshire. The first snow fell in the mountains on the 20th.

The mean temperature was about normal, but while the north was rather warmer than usual the south was rather cooler on the whole. Conditions during the first half of the month were fairly mild, and during the second half, cool. The 1st, 9th, and 13th were warm days on which various places had temperatures of 70 to 72 degrees. The cool period brought day temperatures below 43 in places on the 26th, and readings were not much higher over most of the centre and east. Widespread frost occurred on the following night, Peebles, for example, having 9 degrees of frost. There were fifteen nights with ground frost. During these, among

the lowest readings on the ground was 16 degrees at West Linton on the 27th.

The generally unsettled weather gave some 26 rainy or showery days in the west and 15 in the east. A few places had about 50 per cent more than their normal rainfall, whereas most of the Lowlands and the Caledonian Canal had rather less than usual. Exceptionally heavy rain in Morayshire on the 27th (over 3 inches at Lhanbryde) caused some damage and flooding. Snow was first reported on Ben Nevis and in Shetland on the 20th. Succeeding days brought numerous reports of snow, the depth reaching 3 or 4 inches at unusually low levels in the Cairngorms by the 27th.

Sunshine totals reached or exceeded the average in the extreme north, in Aberdeenshire, and near the Firth of Tay, but elsewhere, especially in Argyll and along the Caledonian Canal, the weather was relatively dull. In the favoured areas the largest total was 143 hours at Leuchars. Against this Oban had only 62 hours or little more than half the normal.

OCTOBER.

The month was extremely mild everywhere, and very wet in most parts of the west.

Mean temperature for the whole country was 2.5 degrees above normal. It was the highest mean for October since 1921. The first ten days were specially warm, and readings of over 65 were reported by some stations. Forres, with 69 degrees on the 9th, had the highest temperature. There were no days which could be described as cold, though slight frosts occurred at high levels in mid-month and the last week. Among the lowest screen readings was 27 degrees at Peebles on the 14th. Ground frosts occurred on 17 nights, the most intense giving a temperature of 23 degrees (9 of frost) at West Linton on both the 8th and the 25th, and at Balmoral on the 14th.

Rainfall totals varied greatly from the west to the east of the country. In the west and centre, the area southwards from Loch Laggan to Ayr and west of Crieff had over double its average amount. Inveraray recorded three times its normal fall. The wettest station in the country—Loan near Loch Quoich—had a total of 29.5 inches. Many places had falls exceeding 4 inches on the 3rd and 5th, and there was some flooding. In the relatively dry eastern area, on the other hand, Dunbar had a total of only 1.42 inch and Wick only 1.62—little more than half the normal. Only light local falls of snow were reported.

The month was dull in most parts. Totals of sunshine in the west and north-west were about 30 hours below normal. Fort William had only 30 hours altogether, that is, less than half its normal. On the other hand, Edinburgh recorded 108 and Dunbar 107 hours, while the usually favoured areas in Fife and on the Moray Firth had between 90 and 100 hours.

NOVEMBER.

The exceptionally mild conditions of October continued in November, especially during the first half. Precipitation, including rain and snow, was greatest in the west and north; but, unlike that of October, was not unduly large; in fact, weather was in general sunny.

Mean temperature for most of the country was about 1 degree above normal, but there were several cold days in the second fortnight. The Ayrshire coast was most favoured. There the excess over normal reached 2 degrees. Only scattered stations had means somewhat below normal. During the mildest spell—2nd to 4th—readings of 55 or more were reported from all areas. Edinburgh and Kilmarnock had 62 degrees on the 3rd. Weather was cool from the 16th to the 19th, but coldest on the 26th-27th. Braemar reported 17 degrees on the 27th. Ground frost occurred on 25 nights and was widespread in the last week. West Linton registered the lowest temperature on the ground—namely, 9 degrees (23 of frost) on the 26th.

Precipitation was frequent except in the east and south-east. The totals were, however, below normal over three-quarters of the country, and such excesses as occurred—namely, in the north and in Ardgour—were not large. For the country as a whole it was the driest month since March. There was widespread snowfall in the centre, north, and west between the 14th and the 18th, and Balmoral had an accumulation of 4 inches on the 18th. In all there were 20 days with snow.

Sunshine totals were mainly good, though most parts north of the line Aberdeen-Islay recorded less than usual. A number of days had each between 6 and 8 hours sunshine, and the month's total exceeded 80 hours over the eastern and southern regions. In the Clyde area it was the brightest November since 1921; Renfrew, for example, had a total of 67 hours. The Great Glen and the Moray Firth were among the least favoured places. The smallest totals were 17 hours at Fort William and Fort Augustus, and a number of other stations had only 20 to 30 hours.

DECEMBER.

The last month of the year was an exceptionally dry one; nevertheless it was dull, few places having more than their normal sunshine. There was a considerable range of temperature and a good deal of fog.

Mean temperature was below normal over most of the country, the exceptional places being in the west and north. There was a cold spell from the 11th to the 14th, which brought the lowest temperatures of the year in some parts of the south. The Forth-Clyde Canal was frozen, and there was skating on the Solway. On the other hand, the Christmas week-end was mild, with tempera-

tures exceeding 50 degrees very generally. During the cold spell the lowest readings were 12 degrees (20 of frost) at West Linton and 14 at Peebles, both on the 13th. The highest readings in the mild spell were 57 degrees at Achnashellach and 56 at Aberdeen on the 26th. Ground frosts occurred on 28 nights. The most intense gave 25 degrees of frost at West Linton on the 11th.

There was only one station which reached its normal rainfall during the month—namely, Achfary (Loch More). This was owing to a very exceptional day's fall of 3.50 inches (paralleled at a number of other places in the same district) on the 31st. There was very little precipitation anywhere in the first week and almost none at all from the 8th to the 16th. Nairn and Moray had less than a quarter of their usual amounts, while most of the east and south-east had less than half. The town of Nairn itself recorded only 0.41 inch, or barely a fifth of its normal figure. Snow was reported on 23 days. Deeside had some 6 inches during widespread falls on 18th-19th, and the north had numerous falls on 30th-31st.

Sunshine was mainly below average, though a few scattered stations had somewhat more than usual. Forres headed the list with 61 hours and at the other extreme were Fort William 7, Lerwick and Cardross 8, and Glasgow 10. Fog was reported on 19 days. It was somewhat persistent in the southern half of the country from the 4th to the 7th and the 11th to the 16th.

RAINFALL (MEASURED IN INCHES) FOR 1943

AT SELECTED STATIONS IN SCOTLAND.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Shetland—Lerwick	4.16	4.16	2.96	3.82	3.21	1.13	3.30	3.99	4.59	3.16	5.11	3.22	42.81
Orkney—Kirkwall	2.86	4.31	2.35	3.70	2.52	1.50	3.30	3.26	3.94	3.46	5.35	2.22	39.86
Caithness—Wick	2.32	3.27	1.06	2.60	2.22	1.76	3.50	3.33	3.54	1.69	4.09	2.03	31.31
Sutherland—Melvich	2.17	4.43	2.10	3.00	1.67	1.45	3.36	3.95	3.91	2.85	5.94	3.04	37.87
Laig	2.36	5.56	3.25	4.06	2.06	1.41	2.86	4.24	3.54	4.88	5.18	3.25	42.65
Ross and Cromarty—													
Fortrose	1.24	2.70	2.12	1.46	3.69	1.46	1.85	3.98	2.31	2.93	3.00	.84	27.58
Tain	1.73	3.17	1.75	2.62	2.86	2.03	2.58	4.20	3.08	2.85	2.74	1.66	31.27
Lochcarron	6.23	11.57	5.15	7.17	4.11	4.91	3.68	5.67	5.73	11.57	7.76	5.51	79.06
Stornoway	4.27	5.78	3.37	3.43	2.26	2.70	4.19	5.25	3.64	7.62	5.13	2.83	60.47
Inverness—													
Inverness	1.53	2.69	2.16	1.76	3.15	1.67	2.20	4.94	2.02	2.77	2.56	.96	28.41
Fort William	8.29	11.22	6.37	9.56	3.97	7.86	5.01	7.03	5.73	15.48	6.39	5.96	92.67
Glenquoich	10.74	21.11	10.13	15.03	5.86	9.62	6.17	9.10	12.79	19.03	10.38	11.50	141.56
Portree	8.64	12.79	7.00	7.11	3.73	5.13	5.00	7.35	6.91	14.95	8.47	6.00	93.08
Nairn—Nairn . . . . .	.91	2.07	1.58	1.23	3.28	1.35	1.48	3.67	2.17	2.45	2.05	.41	22.70
Moray—Gordon Castle	1.90	2.34	1.23	2.00	2.69	1.15	1.73	3.84	3.91	2.21	3.45	.57	27.02
Aberlour (Wester													
Elchies)	1.46	2.02	.99	2.06	3.17	1.29	1.93	4.25	3.72	2.19	3.53	.40	27.01
Banff—Banff	1.97	1.99	1.00	1.76	2.67	1.14	1.30	2.88	3.88	2.12	4.77	.89	26.37
Aberdeen—Peterhead	2.62	1.28	1.18	1.76	3.20	1.37	1.08	3.39	2.69	2.40	5.05	1.24	27.26
Aberdeen (King's Coll.)	2.95	1.03	.71	1.70	4.29	1.96	.96	4.15	8.23	2.07	2.36	.99	26.45
Balmoral	3.22	1.99	1.07	1.66	3.58	1.40	1.25	3.09	3.06	3.30	3.02	1.09	27.73
Kincardine—Fordoun	3.54	1.04	.48	1.26	4.80	2.67	1.39	3.90	2.61	2.67	2.63	1.08	28.07
Angus—													
Montrose (Asylum)	3.35	1.16	.47	1.45	4.88	1.10	1.61	3.94	2.25	2.67	1.21	.97	25.06
Dundee	3.17	1.20	.60	1.45	3.06	3.04	3.11	5.00	2.28	3.23	1.00	1.01	28.75
Glamis Castle	5.12	1.65	.63	1.61	3.16	2.43	2.13	4.74	3.32	4.09	.99	1.42	31.29
Brechin	3.67	1.37	.58	1.14	4.24	1.23	1.63	4.60	2.57	3.03	1.26	1.09	26.41
Perth—Blair Castle	5.27	3.23	1.80	2.86	2.46	2.99	2.09	4.49	3.51	5.91	2.72	2.18	39.51
Crieff	6.45	3.55	1.77	2.36	4.88	3.55	2.31	6.04	4.42	7.97	2.11	2.19	48.20
Perth	3.85	1.77	.83	1.18	3.04	2.87	2.78	4.83	3.16	5.02	1.00	1.78	32.11
Fire—Cupar	4.16	1.10	.67	1.40	3.61	2.07	2.14	4.39	2.81	3.04	1.14	1.48	28.01
Kirkcaldy	3.55	1.63	1.47	1.02	4.53	2.69	2.38	4.03	2.09	2.73	1.90	1.55	29.57
Kinross—Loch Leven	4.41	1.95	1.00	1.28	4.47	2.67	2.25	5.35	3.26	4.51	1.33	2.09	34.57
Clackmannan—													
Tillicoultry	4.50	2.07	1.10	1.68	5.09	3.45	2.75	5.09	4.00	6.58	2.41	1.41	40.13
Argyll—Gruline (Mull)	10.12	8.50	4.95	7.59	3.98	5.71	5.05	8.19	8.66	19.00	6.02	6.35	94.15
Oban	5.78	6.01	3.35	5.01	3.62	5.24	3.33	6.19	4.41	10.63	4.54	4.50	62.61
Glencoe Gardens	10.71	11.00	7.19	10.30	5.34	7.21	5.07	9.03	8.01	20.46	6.28	5.72	106.32
Inveraray	8.45	12.21	7.25	9.75	3.52	9.49	5.24	10.65	7.18	21.18	6.84	6.40	108.06
Bute—Rotheray	5.40	6.17	3.14	4.70	4.08	4.91	3.34	8.41	5.66	9.37	4.46	3.58	63.22
Stirling—Stirling	5.45	3.59	2.15	2.18	4.14	2.79	2.42	5.78	2.94	6.50	1.96	1.61	41.51
Dumbarton—Arrochar	9.21	10.55	4.69	5.63	4.65	8.05	4.22	9.14	6.94	15.88	5.43	5.74	90.13
Helensburgh	5.33	6.12	3.93	4.37	4.52	3.52	3.40	9.53	3.87	10.02	3.17	3.21	60.99
Renfrew—Greenock	7.14	7.06	4.05	4.61	3.85	3.85	2.72	8.78	4.74	12.74	4.11	3.90	67.54
Paistey	4.62	5.82	2.28	2.75	3.22	2.40	2.85	6.08	2.52	7.47	2.13	2.11	44.25
Ayr—Kilmarnock	4.11	5.05	2.36	3.02	3.65	3.21	2.68	5.20	6.73	7.23	2.65	6.69	44.48
Ayr	3.56	3.89	1.67	3.04	2.96	2.39	1.91	4.60	1.99	4.69	2.07	2.60	35.37
Muirkirk	5.33	6.71	2.44	3.52	3.58	4.35	2.40	4.85	2.50	8.40	3.21	3.33	50.62
Ballastra	6.02	3.06	1.19	2.91	2.64	2.87	1.41	4.36	3.28	5.62	3.87	3.30	40.53
Lanark—													
Glasgow (Botanic Gdns.)	4.14	3.90	1.91	2.95	3.47	3.18	2.56	6.51	2.15	6.85	2.01	1.58	41.21
Douglas (Newmains)	4.64	4.42	2.08	2.69	4.24	4.00	2.61	4.20	2.81	6.79	2.27	2.72	43.47
Biggar	2.92	2.94	1.44	2.26	3.03	3.10	2.08	3.13	2.90	4.94	1.71	1.91	32.96
Linlithgow—													
Houston House	3.07	2.49	2.03	1.36	3.79	3.17	2.47	4.43	3.54	4.86	1.28	1.49	33.98
Midlothian—													
Edinburgh (University)	2.24	1.01	1.31	.83	3.50	1.81	2.73	3.66	1.18	3.04	1.20	.95	23.46
Oxenford Castle	2.42	1.54	1.34	1.11	3.17	1.73	2.84	3.11	1.30	2.63	.94	.64	22.77
Haddington—													
North Berwick	1.67	1.00	1.41	.81	3.42	1.66	2.46	3.32	1.64	1.96	.71	.90	20.96
Stobshiels Reservoir	3.10	1.41	1.38	1.20	4.55	2.53	2.98	3.67	1.63	2.60	1.23	1.26	27.44
Berwick—Duns Castle	2.62	1.24	1.00	.99	4.42	2.53	2.39	4.34	1.92	1.99	2.58	1.25	27.27
Marchmont	3.13	1.33	1.13	.80	4.81	2.77	1.98	3.67	1.57	2.25	2.42	1.90	27.66
Peebles—West Linton	3.41	3.13	1.77	1.95	4.32	3.23	2.77	4.04	1.78	5.53	1.83	2.11	35.87
Selkirk—Caddonfoot													
(Fairmile Gardens)	3.52	1.87	.94	1.50	4.21	2.74	3.57	4.49	2.34	4.00	1.57	1.27	32.02
Roxburgh—													
Kelso (Broomlands)	2.68	1.13	1.20	1.13	3.97	3.55	3.16	3.51	1.50	2.01	1.45	.81	26.10
Wolfelee	5.70	2.04	1.22	2.07	4.51	3.52	3.38	5.57	3.34	3.25	1.45	1.46	37.51
Dumfries—Dumfries	5.69	2.88	.99	2.31	4.32	3.27	2.84	6.01	2.50	7.48	2.27	1.76	42.32
Monkalee	8.63	4.71	2.32	3.70	5.64	4.35	2.99	5.74	2.45	9.48	4.84	3.19	58.04
Langholm	8.42	4.84	1.82	3.28	5.27	4.52	3.60	6.50	4.82	7.76	2.83	2.22	56.22
Eskdalemuir	7.90	5.49	2.38	4.01	6.80	6.09	3.90	7.64	5.86	10.09	4.17	2.71	67.04
Kirkcudbright—Castle													
Douglas (Corbleton)	6.82	3.64	1.13	2.54	4.98	3.72	2.62	5.91	2.96	9.63	2.84	2.61	49.40
Carstairs (Cornharrow)	9.38	5.64	2.11	4.04	6.03	5.16	3.59	7.48	2.90	10.07	4.43	3.70	65.13
Auchencalm	6.01	3.96	1.49	2.82	5.42	3.71	3.62	7.20	3.31	8.39	4.04	3.13	53.70
Wigtown—Monreith	5.90	2.23	.64	2.37	4.16	2.93	2.59	6.77	3.05	5.26	3.75	2.31	41.96

AGRICULTURAL STATISTICS.

NOTE.—OWING TO WAR-TIME RESTRICTIONS, DETAILS UNDER TABLES 1-20 ARE NOT AVAILABLE.

EDINBURGH CORN MARKET.

STATEMENT SHOWING THE PRICES OF WHEAT, BARLEY, AND OATS FOR THE YEAR 1943.

The Corn Sales Act of 1921 provides that all sales are to be effected by weight only, and expressed in terms of or by reference to the hundredweight of 112 lb. Experience has proved it to be convenient to quote at a price per 4½ cwt. for Wheat, 4 cwt. for Barley, and 3 cwt. for Oats.

The following statement gives a record of the year's proceedings in Edinburgh Corn Market.

1943.		WHEAT, per 4½ cwt.		BARLEY, per 4 cwt.		OATS, per 3 cwt.	
		Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
		s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
January	6	74 3	..	140 0	120 0	46 3	43 6
"	13	74 3	..	140 0	120 0	46 3	43 6
"	20	74 3	..	140 0	110 0	46 3	43 6
"	27	74 3	..	140 0	100 0	46 3	43 6
February	3	75 9	..	140 0	100 0	47 3	44 6
"	10	75 9	..	140 0	100 0	47 3	44 6
"	17	75 9	..	140 0	90 0	47 3	46 3
"	24	75 9	..	140 0	100 0	47 3	44 6
March	8	77 3	..	140 0	110 0	47 3	44 6
"	10	77 3	..	140 0	90 0	47 3	44 6
"	17	77 3	..	140 0	105 0	47 3	44 6
"	24	77 3	..	140 0	105 0	47 3	44 6
"	31	77 3	..	140 0	100 0	47 3	44 6
April	7	78 9	..	140 0	120 0	48 3	46 0
"	14	78 9	..	140 0	120 0	48 3	40 0
"	21	78 9	..	140 0	100 0	48 3	40 0
"	28	78 9	..	140 0	100 0	48 3	40 0
May	5	78 9	..	140 0	110 0	48 3	46 0
"	12	78 9	..	140 0	110 0	48 3	46 0
"	19	78 9	..	140 0	110 0	48 3	46 0
"	26	78 9	..	140 0	100 0	48 3	46 0
June	2	79 6	..	140 0	120 0	48 3	46 0
"	9	79 6	..	140 0	100 0	48 3	46 0
"	16	79 6	..	140 0	100 0	48 3	46 0
"	23	79 6	..	140 0	90 0	48 9	40 0
"	30	79 6	..	140 0	110 0	48 0	47 0
July	7	79 6	..	140 0	120 0	48 0	47 0
"	14	79 6	..	140 0	120 0	49 0	47 0
"	21	79 6	..	140 0	120 0	48 9	47 0
"	28	79 6	..	140 0	120 0	48 9	46 0
August	4	65 3	..	110 0	105 0	44 3	42 0
"	11	65 3	..	110 0	105 0	44 3	42 0
"	18	65 3	..	110 0	..	44 3	42 0
"	25	65 3	..	110 0	..	44 3	42 0
September	1	65 3	..	110 0	..	44 3	42 0
"	8	65 3	..	110 0	..	44 3	42 0
"	15	65 3	..	110 0	..	44 3	42 0
"	22	65 3	..	110 0	..	44 3	42 0
"	29	65 3	..	110 0	..	44 3	42 0
October	6	65 3	..	110 0	..	44 3	42 0
"	13	65 3	..	110 0	105 0	44 3	42 0
"	20	65 3	..	110 0	105 0	44 3	42 0
"	27	65 3	..	110 0	105 0	44 3	42 0
November	3	66 0	..	110 0	105 0	44 9	42 0
"	10	66 0	..	110 0	105 0	44 9	42 0
"	17	66 0	..	110 0	105 0	44 9	42 0
"	24	66 0	..	110 0	105 0	44 9	42 0
December	1	66 9	..	110 0	105 0	45 3	42 0
"	8	66 9	..	110 0	105 0	45 3	42 6
"	15	66 9	..	110 0	105 0	45 3	42 6
"	22	66 9	..	110 0	105 0	45 3	42 6
"	29	66 9	..	110 0	105 0	45 3	42 6

PRICES OF SHEEP SINCE 1818.

TABLE No. 1.—CHEVIOT SHEEP.

Year.	Wethers.				Ewes.				Lambs.						
	s.	d.		s.	d.	s.	d.	s.	d.	s.	d.	s.	d.		
1818	28	0	to	30	0	not quoted.			8	0	to	10	0		
1819	25	0	"	27	0	15	0	to	17	0	10	6	"	12	0
1820	20	0	"	25	0	16	0	"	17	0	10	0	"	11	0
1821	18	0	"	20	0	14	0	"	16	0	7	6	"	8	0
1822	12	6	"	13	0	8	0	"	8	6	4	6	"	0	0
1823	13	6	"	13	0	7	0	"	10	6	5	6	"	6	0
1824	14	0	"	19	0	7	0	"	9	0	4	6	"	6	0
1825	29	0	"	32	0	15	0	"	19	0	9	0	"	10	6
1826	17	6	"	21	6	13	0	"	15	0	7	0	"	7	6
1827	15	0	"	24	0	not quoted.			7	0	"	8	0		
1828	18	0	"	27	6	12	0	to	15	0	7	0	"	8	2
1829	18	0	"	24	0	12	6	"	14	0	7	0	"	8	6
1830	15	0	"	21	0	8	0	"	11	0	6	0	"	6	9
1831	18	0	"	25	0	9	0	"	13	0	7	0	"	8	0
1832	19	0	"	24	0	11	0	"	16	0	7	0	"	9	0
1833	22	0	"	31	0	13	6	"	20	0	8	0	"	11	3
1834	22	0	"	31	0	13	6	"	21	0	9	0	"	11	6
1835	22	0	"	27	6	18	0	"	20	6	8	0	"	11	0
1836	24	0	"	31	6	16	0	"	19	0	10	0	"	14	0
1837	19	0	"	28	0	14	0	"	19	0	10	0	"	13	0
1838	23	0	"	30	6	17	0	"	22	0	12	0	"	14	0
1839	23	0	"	31	0	14	0	"	19	0	0	0	"	13	0
1840	24	0	"	33	0	15	0	"	23	0	7	0	"	11	6
1841	23	0	"	30	0	14	0	"	22	0	8	0	"	12	0
1842	22	6	"	28	0	18	0	"	17	0	7	6	"	10	0
1843	19	0	"	25	0	8	0	"	12	0	5	0	"	8	0
1844	21	0	"	29	0	10	0	"	16	0	8	0	"	10	6
1845	23	0	"	33	0	18	0	"	20	0	8	0	"	13	0
1846	24	0	"	33	6	14	6	"	21	6	10	0	"	14	6
1847	24	0	"	35	0	13	0	"	24	0	11	6	"	15	0
1848	23	0	"	34	6	13	0	"	23	0	11	6	"	15	0
1849	21	0	"	30	2	12	0	"	21	0	0	0	"	14	0
1850	20	6	"	29	6	12	0	"	20	0	8	0	"	13	0
1851	21	6	"	31	0	13	0	"	21	0	8	9	"	14	0
1852	21	0	"	32	0	15	0	"	23	0	8	0	"	14	0
1853	26	6	"	38	0	17	0	"	28	6	9	0	"	17	0
1854	25	0	"	36	0	17	0	"	26	0	9	0	"	16	6
1855	23	6	"	36	0	16	0	"	25	0	10	0	"	17	0
1856	22	0	"	35	6	15	6	"	24	0	10	0	"	15	0
1857	24	0	"	36	0	14	6	"	26	0	10	6	"	14	6
1858	24	0	"	34	6	14	0	"	24	6	10	6	"	14	0
1859	25	0	"	34	6	16	0	"	25	0	10	8	"	14	9
1860	26	0	"	38	0	17	6	"	27	6	12	6	"	17	6
1861	25	0	"	38	6	16	0	"	26	0	9	0	"	16	0
1862	27	0	"	37	6	17	6	"	28	0	10	0	"	16	0
1863	25	0	"	38	6	19	0	"	28	6	10	6	"	16	0
1864	31	0	"	41	0	21	0	"	31	6	14	0	"	18	0
1865	32	6	"	44	0	22	6	"	33	6	14	6	"	20	0
1866	37	0	"	50	0	29	0	"	42	6	15	0	"	26	0
1867	36	0	"	58	0	18	0	"	25	6	12	0	"	16	0
1868	30	0	"	32	0	15	6	"	21	0	7	6	"	13	0
1869	28	0	"	38	0	15	0	"	22	6	7	6	"	14	0
1870	35	6	"	43	0	18	0	"	28	0	10	0	"	17	0
1871	36	6	"	49	0	22	0	"	33	6	14	0	"	20	0
1872	45	0	"	56	0	32	0	"	42	0	16	0	"	22	0
1873	42	0	"	51	0	25	0	"	42	0	15	6	"	22	0
1874	33	6	"	44	6	21	0	"	36	0	12	0	"	17	0

TABLE NO. 1.—CHEVIOT SHEEP—Continued.

Year.	Wethers.				Ewes.				Lambs.						
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.			
1875	38	0	to	48	6	21	0	to	34	0	13	6	to	28	6
1876	40	0	"	52	6	23	0	"	30	0	13	6	"	25	0
1877	41	0	"	51	0	25	0	"	37	0	15	0	"	24	0
1878	35	6	"	48	0	23	6	"	35	0	14	0	"	22	0
1879	34	0	"	44	0	21	0	"	34	0	14	0	"	20	0
1880	30	0	"	43	6	20	0	"	30	0	12	6	"	20	0
1881	32	0	"	45	6	29	0	"	34	0	14	0	"	20	0
1882	40	0	"	51	0	30	0	"	40	0	14	0	"	20	6
1883	44	0	"	55	6	34	6	"	48	6	15	6	"	28	0
1884	36	0	"	47	6	29	6	"	41	6	12	6	"	20	0
1885	30	0	"	38	0	24	0	"	31	0	12	0	"	18	0
1886	32	0	"	40	0	21	0	"	29	0	12	6	"	19	0
1887	29	0	"	36	0	18	0	"	26	0	11	0	"	16	6
1888	30	0	"	38	0	19	0	"	27	0	12	0	"	17	6
1889	36	0	"	44	0	24	0	"	32	0	14	0	"	22	0
1890	31	0	"	40	0	22	0	"	30	0	12	6	"	20	0
1891	27	0	"	38	0	16	0	"	25	0	9	0	"	16	0
1892	22	0	"	30	6	13	0	"	22	0	5	0	"	11	0
1893	26	0	"	35	6	18	0	"	28	6	8	6	"	15	0
1894	26	0	"	37	0	20	0	"	31	0	10	6	"	18	6
1895	28	0	"	39	0	22	0	"	34	0	11	6	"	19	6
1896	24	6	"	34	0	19	0	"	30	6	9	0	"	16	6
1897	27	0	"	36	0	21	0	"	31	6	11	0	"	17	6
1898	27	0	"	37	0	22	0	"	32	6	12	0	"	18	6
1899	24	0	"	33	0	20	0	"	30	6	10	6	"	16	0
1900	26	0	"	36	0	22	0	"	32	6	12	0	"	17	0
1901	25	0	"	32	6	20	0	"	29	6	11	0	"	16	0
1902	24	0	"	31	6	18	0	"	27	0	9	6	"	14	6
1903	26	0	"	34	0	21	0	"	31	0	11	4	"	18	0
1904	28	6	"	36	6	23	0	"	32	6	13	0	"	20	0
1905	27	6	"	35	0	23	0	"	33	0	14	0	"	21	0
1906	30	0	"	38	0	26	0	"	34	6	15	0	"	23	0
1907	28	0	"	34	0	22	0	"	30	6	13	6	"	19	6
1908	26	0	"	32	6	21	0	"	27	6	11	6	"	17	0
1909	24	0	"	31	0	18	0	"	25	6	9	6	"	16	0
1910	27	0	"	35	0	22	0	"	31	0	12	0	"	20	0
1911	24	0	"	31	6	18	6	"	27	6	10	6	"	18	0
1912	26	0	"	34	6	22	0	"	31	0	13	0	"	21	0
1913	30	0	"	39	0	24	0	"	35	6	16	0	"	24	0
1914	32	6	"	41	0	28	0	"	39	0	18	0	"	27	6
1915	36	0	"	46	0	31	0	"	44	0	20	0	"	30	6
1916	40	6	"	51	0	34	0	"	49	0	22	0	"	34	6
1917	43	6	"	56	0	38	0	"	56	0	24	0	"	34	0
1918	50	0	"	66	0	42	0	"	61	0	25	0	"	37	0
1919	53	0	"	69	0	44	6	"	67	0	28	0	"	40	6
1920	56	0	"	71	0	48	0	"	79	0	34	0	"	49	0
1921	45	0	"	60	0	52	3	"	85	9	33	9	"	52	3
1922	49	0	"	56	0	56	0	"	90	6	27	0	"	50	6
1923	44	0	"	65	0	61	0	"	106	0	30	0	"	62	0

Year.	Wethers.				Ewes.				Lambs.						
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.			
1924	41	0	to	61	0	60	0	to	100	0	31	6	to	58	0
1925	39	3	"	50	0	56	0	"	88	9	22	8	"	50	0
1926	35	0	"	49	3	34	6	"	64	6	26	3	"	42	0
1927	28	9	"	46	3	32	6	"	55	6	23	3	"	39	0
1928	28	3	"	48	6	30	6	"	55	6	22	9	"	47	9
1929	33	6	"	54	6	34	9	"	52	0	25	6	"	47	0
1930	36	0	"	54	0	35	0	"	74	6	24	0	"	47	3
1931	24	0	"	45	6	23	0	"	50	9	17	0	"	37	0
1932	16	0	"	26	6	18	0	"	36	6	10	0	"	24	6
1933	16	0	"	25	0	2	3	"	40	0	16	6	"	31	6
1934	16	0	"	34	3	22	6	"	44	6	19	6	"	33	3
1935	22	0	"	37	3	24	0	"	44	3	16	0	"	33	3
1936	24	6	"	50	0	28	0	"	55	0	18	6	"	37	6
1937	24	6	"	49	6	29	9	"	76	6	19	0	"	45	3
1938	17	0	"	39	6	20	9	"	64	0	10	9	"	31	6
1939	19	6	"	42	9	19	6	"	43	3	11	6	"	39	9
1940	31	0	"	64	0	22	6	"	60	0	15	6	"	41	0
1941	36	6	"	66	9	26	6	"	71	0	18	3	"	50	0
1942	37	0	"	67	3	31	6	"	90	0	20	6	"	50	6
1943	39	6	"	72	9	34	6	"	140	0	23	6	"	64	0

TABLE NO. 2.—BLACKFACE SHEEP.

Year.	Wethers.		Ewes.		Lambs.	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1819	22 0	to 24 0	12 0	to 15 0	8 0	to 9 0
1820	20 0	" 22 3	15 6	" 17 0	7 0	" 8 6
1821	18 0	" 20 0	12 0	" 13 0	6 0	" 7 0
1822	11 6	" 13 6	5 6	" 6 0	4 6	" 0 0
1823	12 0	" 16 0	5 0	" 6 6	4 0	" 5 3
1824	9 6	" 13 6	6 0	" 7 0	4 0	" 5 0
1825	22 0	" 26 6	11 0	" 13 6	6 0	" 9 0
1826	15 0	" 17 0	8 0	" 9 0	4 6	" 6 0
1827	14 0	" 18 6	7 0	" 10 0	6 0	" 7 6
1828	15 0	" 20 0	8 0	" 11 0	5 0	" 7 6
1829	14 0	" 18 0	9 0	" 10 0	6 0	" 7 0
1830	9 6	" 12 0	4 0	" 6 0	4 6	" 6 0
1831	13 0	" 17 0	5 0	" 7 6	5 0	" 6 6
1832	14 0	" 18 0	7 0	" 11 6	6 0	" 7 3
1833	16 0	" 24 0	7 6	" 12 0	6 6	" 9 0
1834	16 0	" 22 0	10 0	" 13 0	6 0	" 8 6
1835	15 0	" 18 9	10 0	" 13 0	7 0	" 8 0
1836	15 0	" 21 0	9 0	" 12 0	8 6	" 11 0
1837	18 0	" 16 0	8 0	" 12 0	8 0	" 9 6
1838	15 0	" 20 6	10 0	" 13 0	not quoted	
1839	15 0	" 22 0	10 0	" 12 0	7 0	to 8 3
1840	15 0	" 22 6	11 0	" 12 0	7 0	" 9 3
1841	16 0	" 20 0	9 0	" 11 0	6 0	" 8 0
1842	14 0	" 19 0	7 6	" 8 0	5 6	" 7 0
1843	not quoted		4 9	" 6 6	not quoted	
1844	15 0	to 21 0	6 6	" 10 0	5 0	to 8 0
1845	14 0	" 23 0	8 0	" 12 0	6 0	" 8 0
1846	13 0	" 24 0	10 0	" 13 0	8 0	" 9 0
1847	20 6	" 25 0	10 0	" 14 0	8 6	" 9 6
1848	20 0	" 24 0	11 3	" 12 0	8 6	" 10 0
1849	not quoted		not quoted		7 0	" 7 6
1850					7 0	" 0 0
1851	17 6	to 23 0	9 0	to 12 0	6 6	" 8 0
1852	18 6	" 22 0	9 6	" 12 0	4 6	" 7 9
1853	23 0	" 27 0	14 6	" 16 6	8 0	" 11 6
1854	20 0	" 26 0	11 0	" 16 6	8 0	" 10 6
1855	23 6	" 26 6	14 0	" 16 0	10 0	" 11 0
1856	17 0	" 24 0	10 0	" 20 0	7 6	" 10 0
1857	20 0	" 29 0	10 6	" 15 0	9 3	" 11 0
1858	20 0	" 27 6	9 9	" 18 9	8 3	" 10 6
1859	20 0	" 25 0	10 0	" 14 0	8 9	" 11 0
1860	21 0	" 27 3	11 0	" 16 0	10 0	" 13 6
1861	21 0	" 29 0	12 0	" 22 0	6 3	" 14 0
1862	16 9	" 27 0	12 0	" 18 8	6 0	" 12 0
1863	20 0	" 30 6	13 0	" 16 0	8 0	" 11 6
1864	25 0	" 30 0	15 0	" 19 0	10 0	" 13 6
1865	15 6	" 32 6	15 0	" 25 0	10 0	" 17 0
1866	31 8	" 40 0	20 0	" 36 0	13 6	" 22 6
1867	20 0	" 30 6	14 0	" 22 0	7 6	" 13 6
1868	20 0	" 26 0	10 8	" 13 6	7 0	" 13 0
1869	22 0	" 28 0	11 0	" 14 0	6 9	" 9 0
1870	27 0	" 32 6	13 0	" 22 0	8 0	" 14 6
1871	23 0	" 37 0	13 0	" 23 0	11 0	" 16 3
1872	31 6	" 45 0	18 0	" 32 0	12 6	" 18 0
1873	28 0	" 39 0	16 6	" 27 0	7 0	" 16 0
1874	25 0	" 35 0	13 0	" 20 0	7 0	" 14 0
1875	26 6	" 37 6	15 0	" 21 3	9 6	" 17 6
1876	30 0	" 40 0	19 0	" 24 0	13 0	" 20 6
1877	35 0	" 38 9	18 0	" 25 0	13 6	" 23 0
1878	30 0	" 36 0	17 0	" 23 0	12 0	" 22 0
1879	25 0	" 35 9	16 0	" 24 0	10 6	" 20 0
1880	25 0	" 33 0	16 6	" 22 6	10 0	" 17 0
1881	30 0	" 39 0	15 0	" 23 0	10 0	" 15 0
1882	33 0	" 46 0	20 0	" 28 0	12 6	" 18 6
1883	36 0	" 56 6	24 6	" 33 0	14 0	" 21 6
1884	29 0	" 43 6	19 6	" 28 0	12 0	" 19 6
1885	24 0	" 34 0	13 0	" 22 6	10 0	" 15 0
1886	25 0	" 34 0	12 0	" 22 0	10 6	" 16 0
1887	22 0	" 30 0	11 0	" 19 0	8 0	" 13 0
1888	22 0	" 32 0	13 0	" 24 0	10 0	" 15 0
1889	24 0	" 40 0	13 0	" 29 0	13 0	" 22 0

TABLE NO. 2.—BLACKFACE SHEEP—Continued.

Year.	Wethers.				Ewes.				Lambs.						
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.			
1890	24	0	to	37	0	14	0	to	27	0	10	6	to	19	0
1891	21	0	"	37	0	10	0	"	24	0	7	6	"	15	0
1892	16	0	"	28	6	6	0	"	17	0	3	0	"	10	0
1893	21	0	"	37	0	12	0	"	24	0	7	0	"	14	0
1894	20	0	"	37	0	14	6	"	26	6	8	6	"	16	6
1895	23	0	"	41	0	16	0	"	28	6	9	0	"	17	0
1896	19	0	"	35	4	13	0	"	24	0	6	0	"	13	6
1897	21	0	"	36	6	15	0	"	25	6	7	0	"	14	6
1898	22	0	"	37	0	16	0	"	26	6	8	0	"	15	0
1899	20	0	"	33	6	13	0	"	24	0	5	6	"	13	0
1900	23	0	"	36	0	16	0	"	26	6	8	0	"	15	6
1901	20	0	"	35	0	14	0	"	25	6	6	6	"	14	6
1902	18	6	"	34	0	12	0	"	24	0	6	0	"	14	0
1903	21	0	"	36	0	15	0	"	28	0	7	0	"	16	6
1904	23	0	"	38	6	18	0	"	30	0	8	6	"	17	6
1905	21	6	"	37	0	19	0	"	31	0	9	0	"	18	6
1906	23	0	"	38	0	20	0	"	33	0	10	0	"	19	6
1907	21	0	"	33	6	17	0	"	28	0	8	6	"	17	6
1908	19	6	"	30	0	15	0	"	24	6	8	0	"	16	0
1909	17	0	"	28	0	11	6	"	22	0	6	3	"	13	0
1910	21	0	"	32	6	16	0	"	27	6	8	0	"	17	0
1911	19	0	"	29	6	14	0	"	24	0	7	0	"	15	0
1912	21	6	"	32	6	17	0	"	27	6	9	6	"	17	6
1913	24	6	"	36	0	21	0	"	31	0	12	6	"	21	6
1914	27	0	"	38	6	25	0	"	34	6	15	6	"	24	0
1915	31	0	"	42	6	29	0	"	39	6	17	0	"	25	6
1916	33	0	"	46	6	31	0	"	42	0	19	0	"	27	6
1917	36	0	"	51	0	33	0	"	47	0	21	0	"	30	0
1918	41	0	"	56	0	36	0	"	50	0	27	0	"	33	0
1919	44	0	"	62	0	39	0	"	54	0	29	0	"	36	0
1920	46	0	"	66	0	44	0	"	62	0	31	0	"	43	0
1921	32	9	"	60	9	35	3	"	62	6	20	3	"	47	0
1922	40	3	"	63	0	40	6	"	74	0	18	0	"	44	0
1923	46	0	"	65	6	43	0	"	78	0	21	0	"	45	6
1924	46	0	"	68	6	45	6	"	85	0	25	0	"	55	6
1925	36	0	"	60	0	40	0	"	78	0	17	6	"	44	0

Year.	Wethers.				Ewes.				Lambs.						
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.			
1926	30	0	to	54	0	31	0	to	70	0	21	9	to	50	0
1927	26	6	"	48	0	26	0	"	64	0	17	9	"	37	9
1928	29	0	"	45	9	24	0	"	57	0	16	6	"	38	9
1929	29	9	"	46	0	29	0	"	64	0	20	9	"	37	6
1930	31	6	"	45	0	28	6	"	60	0	20	0	"	37	6
1931	19	6	"	29	9	15	0	"	33	0	14	3	"	40	6
1932	12	0	"	19	6	15	0	"	29	0	7	3	"	14	6
1933	..	..	..	..	20	0	"	34	0	12	9	"	19	3
1934	..	..	..	..	22	6	"	44	0	16	0	"	25	3
1935	..	..	..	..	26	0	"	40	0	16	0	"	26	9
1936	..	..	..	..	27	6	"	48	0	18	6	"	37	6
1937	..	..	..	..	32	0	"	54	0	22	6	"	39	3
1938	..	..	..	..	22	0	"	50	0	12	6	"	28	0
1939	..	..	..	..	17	6	"	40	0	12	6	"	24	6
1940	..	..	..	..	22	6	"	50	0	16	0	"	35	3
1941	..	..	..	..	27	6	"	52	6	19	0	"	45	0
1942	..	..	..	..	28	0	"	51	0	16	9	"	39	6
1943	34	0	to	61	9	32	6	"	63	0	21	9	"	14	0

TABLE NO. 3.—PRICE OF WOOL, PER STONE OF 24 LB., SINCE 1818.

Year.	Laid Cheviot.		White Cheviot.		Laid Highland		White Highland	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1818	40 0	to 42 2	..	..	20 0	to 22 6	..	..
1819	21 0	" 22 0	..	..	10 0	" 10 8	..	..
1820	20 0	" 22 0	..	..	9 0	" 10 0	..	..
1821	18 0	" 20 0	..	..	9 0	" 10 0	..	..
1822	12 6	" 14 6	..	..	5 0	" 6 6	..	..
1823	9 0	" 10 6	..	..	5 0	" 5 9	..	..
1824	13 6	" 15 0	..	..	6 0	" 6 8	..	..
1825	10 6	" 22 0	..	..	10 0	" 10 6	..	..
1826	11 0	" 14 0	..	..	5 0	" 5 6	..	..
1827	11 0	" 14 0	..	..	5 6	" 6 9	..	..
1828	8 0	" 11 0	..	..	5 6	" 6 0	..	..
1829	8 6	" 11 0	..	..	4 8	" 0 0	..	..
1830	9 6	" 11 0	..	..	4 6	" 5 0	..	..
1831	17 0	" 20 0	..	..	7 6	" 8 6	..	..
1832	14 0	" 16 0	..	..	7 0	" 7 6	..	..
1833	18 0	" 20 7	..	..	10 0	" 11 0	..	..
1834	21 0	" 24 6	..	..	5 6	" 7 0	..	..
1835	19 0	" 20 6	..	..	9 6	" 10 8	..	..
1836	21 0	" 25 0	..	..	10 0	" 14 0	..	..
1837	12 0	" 14 0	..	..	7 0	" 7 8	..	..
1838	19 0	" 22 6	..	..	6 0	" 10 0	..	..
1839	18 0	" 20 0	..	..	8 0	" 12 0	..	..
1840	15 0	" 0 0	..	..	7 0	" 0 0	..	..
1841	15 0	" 16 9	..	..	6 0	" 7 5	..	..
1842	12 6	" 14 0	..	..	not quoted.		..	..
1843	9 0	" 11 6	..	..	5 0	to 6 0	..	..
1844	15 0	" 18 0	..	..	not quoted.		..	..
1845	14 6	" 17 6	..	..	7 6	to 8 6	..	..
1846	12 0	" 14 6	..	..	8 0	" 8 6	..	..
1847	12 6	" 14 0	..	..	not quoted		..	..
1848	9 6	" 11 0	..	..	4 9	to 0 0	..	..
1849	12 0	" 16 6	..	..	6 0	" 6 8	..	..
1850	15 0	" 17 6	..	..	8 0	" 8 6	..	..
1851	12 0	" 16 0	..	..	8 0	" 9 8	..	..
1852	13 0	" 15 0	..	..	8 0	" 9 0	..	..
1853	19 0	" 22 0	..	..	11 0	" 12 6	..	..
1854	12 0	" 15 0	..	..	7 6	" 8 6	..	..
1855	14 6	" 19 0	..	..	8 6	" 9 0	..	..
1856	19 0	" 21 6	..	..	11 0	" 0 0	..	..
1857	19 0	" 24 0	..	..	18 0	" 14 3	..	..
1858	15 0	" 17 0	..	..	8 9	" 10 0	..	..
1859	18 6	" 24 0	..	..	10 9	" 11 6	..	..
1860	22 0	" 32 0	87 0 to 38 0	..	10 0	" 11 8	..	..
1861	19 6	" 27 0	from 30s. upwards	..	not quoted.		..	..
1862	18 6	" 26 0	30 0 to 37 0	..	11 6	to 16 0	..	..
1863	25 6	" 31 0	38 0 " 42 0	..	15 8	" 17 6	..	..
1864	31 0	" 39 0	47 0 " 54 0	..	17 6	" 20 0	..	..
1865	28 0	" 30 0	44 0 " 45 0	..	15 0	" 17 0	..	..
1866	24 0	" 30 0	30 0 " 38 0	..	14 0	" 16 0	..	..
1867	16 0	" 21 6	not quoted.	..	not quoted.		..	..
1868	19 0	" 26 0	28 0 to 32 0	..	8 6	to 9 0	..	..
1869	18 0	" 26 6	not quoted.	..	8 6	" 10 0	..	..
1870	15 0	" 23 6	25 0 to 26 0	..	9 6	" 0 0	..	..
1871	20 0	" 26 6	30 0 " 34 6	..	12 0	" 15 0	..	..
1872	26 0	" 37 6	40 0 " 48 0	..	18 0	" 21 0	..	..
1873	17 0	" 18 0	34 0 " 40 0	..	9 0	" 12 0	..	..
1874	18 6	" 26 6	30 0 " 34 0	..	9 6	" 13 0	..	..
1875	25 0	" 32 0	34 6 " 36 0	..	12 6	" 16 0	..	..
1876	20 0	" 24 0	30 6 " 34 6	..	9 6	" 12 0	..	..
1877	20 9	" 26 0	28 0 " 30 0	..	10 0	" 12 0	..	..
1878	18 9	" 25 0	27 0 " 32 0	..	8 6	" 11 6	..	..
1879	15 0	" 17 0	prices very low.	..	7 0	" 0 0	..	..
1880	20 0	" 24 0	30 0 to 32 0	..	10 6	" 11 6	14 0	to 15 0
1881	17 0	" 21 0	27 0 " 30 0	..	5 0	" 9 6	12 0	" 13 0
1882	14 0	" 18 0	27 6 " 28 0	..	7 6	" 9 0	13 0	" 14 0
1883	18 0	" 18 0	26 0 " 28 0	..	6 6	" 8 6	11 6	" 12 6
1884	13 0	" 18 0	26 0 " 28 0	..	6 6	" 8 6	11 6	" 12 6
1885	12 0	" 17 0	22 6 " 26 0	..	6 0	" 8 0	11 6	" 12 0
1886	13 0	" 18 0	23 0 " 27 6	..	6 6	" 8 6	11 6	" 12 0
1887	14 0	" 22 0	23 0 " 28 0	..	7 0	" 9 0	11 6	" 13 0
1888	13 0	" 20 0	23 0 " 28 0	..	7 0	" 9 0	11 0	" 12 6

TABLE NO. 3.—PRICE OF WOOL—Continued.

Year.	Laid Cheviot.				White Cheviot.				Laid Highland.				White Highland.							
	s.	d.	to	s.	d.	s.	d.	to	s.	d.	s.	d.	to	s.	d.	s.	d.	to	s.	d.
1889	13	0	to	18	0	24	0	to	28	0	7	0	to	9	0	11	0	to	12	6
1890	13	0	"	18	0	24	0	"	28	0	7	0	"	9	0	11	0	"	12	6
1891	12	6	"	18	0	22	0	"	28	0	7	0	"	9	0	11	0	"	12	6
1892	12	0	"	18	0	20	0	"	28	0	7	0	"	8	6	10	6	"	12	0
1893	12	0	"	17	0	20	0	"	27	0	7	0	"	8	0	10	0	"	12	0
1894	12	0	"	16	0	20	0	"	26	0	7	0	"	8	0	10	0	"	12	0
1895	12	6	"	16	6	20	0	"	25	0	7	0	"	8	0	10	0	"	11	6
1896	11	0	"	15	0	19	0	"	24	0	7	0	"	8	0	10	0	"	11	6
1897	11	0	"	14	0	18	0	"	23	0	7	0	"	8	0	10	6	"	12	0
1898	10	0	"	13	0	16	0	"	20	0	7	0	"	8	0	10	0	"	11	6
1899	10	0	"	13	0	15	0	"	18	6	7	0	"	8	0	8	6	"	9	6
1900	9	9	"	12	0	13	0	"	18	6	6	9	"	7	9	8	0	"	9	6
1901	9	0	"	10	0	11	0	"	16	6	5	9	"	6	6	8	0	"	9	0
1902	9	0	"	10	0	11	6	"	17	0	6	0	"	6	6	8	6	"	9	6
1903	10	0	"	12	0	15	0	"	18	0	7	0	"	8	0	11	6	"	12	6
1904	15	0	"	17	0	20	0	"	21	0	9	0	"	10	0	14	0	"	15	0
1905	17	0	"	20	0	24	0	"	26	0	10	0	"	11	0	15	0	"	16	0
1906	18	0	"	21	0	27	0	"	28	6	11	6	"	13	0	16	6	"	17	6
1907	*					22	0	"	24	0	11	0	"	12	6	16	0	"	17	0
1908	*					16	0	"	18	0	†					8	0	"	8	6
1909	*					24	0	"	26	0	†					12	6	"	14	0
1910	*					25	0	"	30	0	†					13	0	"	14	8
1911	*					25	0	"	30	0	†					13	0	"	14	6
1912	*					24	0	"	29	0	†					14	0	"	15	0
1913	*					25	0	"	30	0	†					17	0	"	18	0
1914	*					24	0	"	29	0	†					15	0	"	15	6
1915†	*					42	0	"	46	0	†					21	0	"	22	0

- No Cheviots smeared now.

† No Highlands smeared now.

† These are July prices.

PRICE OF WOOL PER STONE OF 24 LB.—Continued.

		CHEVIOT.				HALF-BRED.				BLACK-FACE.		CROSS-BRED (BLACKFACE EWE AND LEICESTER RAM).			
		Hogg.		EWE AND WETHER.		Hogg.		EWE AND WETHER.		Hogg.	EWE AND WETHER.	Hogg.		EWE AND WETHER.	
		Washed.	Un- washed.	Washed.	Un- washed.	Washed.	Un- washed.	Washed.	Un- washed.			Washed.	Un- washed.	Washed.	Un- washed.
s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1916	CAITHNESS & SUTH- ERLAND	36 6	30 0	38 0	27 6	34 6	28 6	38 0	27 6	23 0	23 0	28 6	25 6	28 6	25 6
		40 0	32 6	34 0	29 0	35 0	29 0	34 0	28 6						
1917	CAITHNESS & SUTH- ERLAND	40 6	33 0	37 0	31 0	38 6	31 6	37 0	31 0	25 6	25 6	31 6	28 6	31 0	28 6
		44 6	36 0	37 6	32 6	39 0	32 6	37 6	31 6						
1918	CAITHNESS & SUTH- ERLAND	43 6	35 6	39 6	33 0	41 0	33 6	39 6	33 0	27 0	27 0	33 6	30 6	33 6	30 6
		47 6	38 6	40 0	34 6	41 6	34 6	40 0	33 6						
1919	CAITHNESS & SUTH- ERLAND	84 0	70 0	82 0	66 0	82 0	62 0	70 0	58 0	34 0	34 0	46 0	39 0	44 0	38 0
		88 0	74 0	84 0	68 0	84 0	63 0	72 0	60 0						
1920	CAITHNESS & SUTH- ERLAND	86 0	70 0	83 0	66 0	74 0	54 0	65 0	50 0	24 0	24 0	35 0	29 0	34 0	27 0
		90 0	74 0	87 0	68 0	76 0	56 0	68 0	52 0						
1921	CAITHNESS & SUTH- ERLAND	22 0	17 0	19 0	15 0	18 6	14 6	16 0	13 0	9 6	9 6	12 0	10 0	12 0	10 0
		23 0	18 0	20 0	16 0	19 6	15 6	17 0	14 0						
1922	CAITHNESS & SUTH- ERLAND	30 0	25 0	26 0	22 0	26 0	20 0	22 0	18 0	16 0	16 0	16 6	15 0	16 6	15 0
		31 6	26 0	27 0	23 0	27 0	21 0	23 0	19 0						
1923	CAITHNESS & SUTH- ERLAND	41 0	34 0	36 0	30 0	33 0	27 0	30 0	25 0	17 6	17 6	20 0	18 0	20 0	18 0
		43 0	35 0	37 0	31 0	34 0	28 0	31 0	26 0						
1924	CAITHNESS & SUTH- ERLAND	58 0	49 0	53 0	45 0	49 0	40 0	45 0	39 0	25 6	25 6	34 6	30 6	33 0	30 0
		60 0	50 0	54 0	46 0	50 0	41 0	46 0	40 0						
1925	CAITHNESS & SUTH- ERLAND	39 0	34 0	36 0	30 0	33 6	28 6	32 0	27 0	25 6	15 0	26 0	23 6	25 6	23 0
		40 0	35 0	37 0	31 0	34 0	29 0	33 0	28 0						
1926	CAITHNESS & SUTH- ERLAND	35 0	29 0	32 0	28 0	32 0	16 6	28 0	24 6	19 0	19 0	22 6	20 0	22 0	19 6
		36 0	30 0	33 0	29 0	33 0	17 6	29 0	25 6						
1927	CAITHNESS & SUTH- ERLAND	38 0	31 0	35 0	31 0	34 6	29 6	32 0	27 6	24 0	24 0	27 0	25 6	27 0	25 0
		39 0	32 0	36 0	32 0	35 0	30 0	33 0	28 6						
1928	Do.	51 0	43 0	48 0	41 0	47 0	40 0	43 0	37 0	24 6	24 6	33 0	31 0	32 0	30 0
		52 0	44 0	49 0	42 0	48 0	41 0	44 0	38 0						
1929		37 0	32 0	34 0	29 0	34 0	29 0	32 0	27 0	24 0	24 0	27 0	25 0	26 0	24 0
		23 0	19 0	22 0	18 0	21 0	17 6	20 0	16 6						
1930		16 6	13 6	15 6	13 0	15 0	13 0	13 6	11 6	11 0	11 0	12 0	10 6	11 6	10 0
		14 6	11 6	14 0	11 6	12 6	11 6	11 6	9 6						
1931		20 0	17 0	19 0	16 0	18 0	16 0	17 0	14 0	11 6	11 6	12 0	11 0	11 6	11 0
		21 6	17 6	21 0	17 0	19 0	17 0	17 0	14 0						
1932		26 0	21 0	24 6	19 6	21 6	19 0	19 0	17 0	10 6	10 6	14 0	12 6	14 0	12 6
		27 0	22 0	25 6	20 0	21 6	19 0	19 0	17 0						
1933		39 0	35 0	38 0	33 6	34 6	32 0	34 6	31 6	26 0	26 0	32 0	29 0	32 0	29 0
		22 0	19 6	21 6	18 6	21 0	18 6	20 0	18 6						
1934		26 0	22 0	25 6	21 6	24 0	21 6	23 6	21 6	15 0	15 0	21 0	19 0	21 0	19 0
		37 0	30 6	37 0	30 6	33 0	29 6	33 0	29 6						
1935		42 0	35 6	42 0	35 6	37 6	34 0	37 6	34 0	29 0	29 0	33 0	30 0	33 0	30 0
		47 0	40 0	47 0	40 0	42 0	38 6	42 0	38 6						
1936		47 0	40 0	47 0	40 0	42 0	38 6	42 0	38 6	33 0	33 0	37 0	34 0	37 0	34 0

The prices given were prices fixed by Government, and not free market prices.

Premiums awarded by the Society, 1943.

VETERINARY DEPARTMENT.

CLASS EXAMINATIONS, 1943.

Silver Medals were awarded to the following :—

GLASGOW VETERINARY COLLEGE.

Chemistry	Elizabeth T. Crawford, Glenfinnan.
Biology	Elizabeth T. Crawford, Glenfinnan.
Senior Anatomy	Alexander M'Kenzie, Balloch.
Junior Anatomy	Gilbert Young, Glasgow.
Physiology	Gilbert Young, Glasgow.
Zootechny	George M. Urquhart, Glasgow.
Pathology	Peter S. Hastie, Rutherglen.
Hygiene	Andrew Wilson, Lennoxton.
Surgery	William Stewart, Girvan.
Medicine	Margaret B. Cooper, Ayr.
Histology	Gilbert Young, Glasgow.
Pharmacology	John Burns, Dumbarton.
Parasitology	Thomas C. Donholm, Glasgow.

13 Large Silver Medals, £24, 9s. 7d.

ROYAL (DICK) VETERINARY COLLEGE.

Chemistry	J. M. Wilson, Gateshead.
Biology	W. C. D. Hare, Edinburgh.
Senior Anatomy	H. P. Harding, Pembey.
Junior Anatomy	G. G. Gledhill, Ashton-under-Lyne.
Physiology	J. H. C. Smith, Cambridge.
Zootechny	G. G. Gledhill, Ashton-under-Lyne.
Pathology	L. J. P. Duncan, Aberdeen.
Hygiene	G. Duncan, Blairgowrie.
Surgery	P. Stuart, Loch Laggan.
Medicine (equal)	{ P. Stuart, Loch Laggan. G. M'Iroy, Larne.
Histology	J. B. Wilson, Nantwich.
Pharmacology	G. Duncan, Blairgowrie.
Parasitology	K. J. R. MacLennan, North Ferriby.

14 Large Silver Medals, £26, 7s. 1d.

LOCAL GRANTS, &c., 1943.

11 Districts—Grants of £15 each for Stallions engaged	£165	0	0
Special Grants: Medals, £20, 14s.	45	14	0
Medals for Scottish Gardens and Allotments Competition	6	18	2
3 ,, Medals for Hoeing Competition, 1942-43	2	15	10
4 ,, Medals for Ploughing, 1942-43	3	18	8
Long Service Certificates, £39, 11s. 11d.; and Silver Medals, £22, 12s. 11d. (1942-43)	62	4	10
	<hr/>		
	£286	11	6

ABSTRACT OF PREMIUMS.

Local Grants	£224	6	8
Long Service Awards	62	4	10
Veterinary Collogos (27 Medals)	50	16	8
	£337	8	2

STATE OF THE FUNDS

OF

THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND

As at 30th NOVEMBER 1943

GENERAL FUNDS.

BRITISH GOVERNMENT SECURITIES—

£25,000 3½ per cent War Loan, at 103½	£25,765 12 6
£1,679, 15s. 4d. 2½ per cent Consolidated Stock, at 80	1,343 14 7
£20,000 3½ per cent Conversion Loan, at 105.	21,000 0 0
£2,500 3 per cent Do. do. at 103½	2,593 15 0
£5,000 3 per cent Funding Loan, at 100½	5,034 7 6
£1,000 3 per cent Defence Bonds, at 102	1,020 0 0
£10,000 3 per cent War Loan, at 101½	10,150 0 0
£2,300 3 per cent Savings Bonds, 1955-65, at 100½	2,321 11 3
	<hr/>
	£69,229 0 10

II. HERITABLE BOND—

£2,500 at Commissioners' Rates	2,500 0 0
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III. RAILWAY DEBENTURE AND PREFERENCE STOCKS—

£17,050 London and North Eastern Railway Co. 3 per cent Debenture Stock, at 82	£13,981 0 0
£11,554 Do. do. 4 per cent do., at 104½	12,073 18 7
£16,105 London Midland and Scottish Railway Co. 4 per cent Debenture Stock, at 105½	16,990 15 6
£1,500 Do. do. 4 per cent Preference Stock, at 75½	1,136 5 0
£708 Southern Railway Co. 4 per cent Debenture Stock, at 111	780 6 7
£450 Do. do. 5 per cent Preference Stock, at 115	517 10 0
£112 Do. do. 5 per cent Guaranteed Preference Stock, at 125½	140 11 2
	<hr/>
	45,620 6 10

IV. BANK STOCKS—

£5,365 0 0 Royal Bank of Scotland Stock, at 47½ x.d.	£25,483 15 0
£2,218 16 5 Bank of England Stock, at 365	8,098 13 11
£1,777 0 0 Bank of Scotland Stock, at 64s. 6d.	5,730 16 6
£2,850 0 0 Barclays Bank Ltd. "B" Stock, at 77s.	10,972 10 0
	<hr/>
	50,285 15 5

V. COLONIAL GOVERNMENT STOCKS—

£2,000 Western Australia 4 per cent Inscribed Stock (1942-62), at 101½	£2 035 0 0
£2,000 New Zealand Government 5 per cent Inscribed Stock (1946), at 105½	2,105 0 0
£1,120 Victorian Government 3½ per cent Consolidated Inscribed Stock (1929-49), at 100½	1,125 12 0
	<hr/>
	5,265 12 0

VI. CORPORATION MORTGAGE—

£5,000 on Loan to Edinburgh Corporation at 4 per cent, maturing Martinmas 1944	5,000 0 0
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VII. TEMPORARY LOAN—

£2,000 on Loan to Edinburgh Corporation	2,000 0 0
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VIII. DEPOSIT RECEIPTS with the Royal Bank of Scotland, Edinburgh

	1,500 0 0
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IX. ESTIMATED VALUE of Building—

8 Eglinton Crescent, Edinburgh	5,000 0 0
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X. ESTIMATED VALUE of Furniture, Paintings, Books, &c.

	1,500 0 0
--	-----------

Carry forward	£187,900 15 1
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	Brought forward	£187,900 15 1
XI. ARREARS OF SUBSCRIPTIONS considered recoverable	.	178 19 6
XII. BALANCES at 30th November 1943	.	875 15 2
AMOUNT OF GENERAL FUNDS	.	£188,455 9 9

SPECIAL FUNDS.

TWEEDDALE GOLD MEDAL FUND—

£605 London and North-Eastern Railway Co. 4 per cent Debenture Stock, at 104½	.	£632 4 6
£100 3 per cent Local Loans Stock, at 94½	.	94 15 0
Sum on Deposit Receipt with British Linen Bank	.	100 17 8
		<hr/>
		£827 17 2

FIFE AND KINROSS PERPETUAL GOLD CHALLENGE CUP FUND—

£268 London and North-Eastern Railway Co. 3 per cent Debenture Stock, at 82	£219 15 4
£201 Do. do. 4 per cent First Guaranteed Stock, at 96	192 19 4
Sum on Deposit Receipt with British Linen Bank	119 6 6
	<hr/>
	532 1 2

PAISLEY PERPETUAL GOLD CHALLENGE CUP FUND—

£302 London and North-Eastern Railway Co. 3 per cent Debenture Stock, at 82	£657 12 10
£100 3 per cent Savings Bonds, 1955-65, at 100½	100 18 9
Sum on Deposit Receipt with British Linen Bank	101 0 4
	<hr/>
	859 11 11

RENFREWSHIRE PERPETUAL GOLD CHALLENGE CUP FUND—

£668 London and North-Eastern Railway Co. 3 per cent Debenture Stock, at 82	£547 15 2
£100 3 per cent Savings Bonds, 1955-65, at 100½	100 18 9
Sum on Deposit Receipt with British Linen Bank	92 18 11
	<hr/>
	741 12 10

WILLIAM TAYLOR MEMORIAL PRIZE FUND—

£401 London and North-Eastern Railway Co. 3 per cent Debenture Stock, at 82	£328 16 5
£100 3 per cent Savings Bonds, 1955-65, at 100½	100 18 9
Sum on Deposit Receipt with British Linen Bank	73 0 9
	<hr/>
	502 15 11

WILLIAM DUTHIE PERPETUAL SILVER CHALLENGE CUP FUND—

£260 2½ per cent Consolidated Stock, at 80	£208 0 0
Sum on Deposit Receipt with British Linen Bank	26 2 3
	<hr/>
	234 2 3

THE JAMES ARCHIBALD PRIZE—

£612, 1s. 6d. 3½ per cent War Loan, at 103½	£631 2 4
Sum on Deposit Receipt with Royal Bank of Scotland	75 11 6
	<hr/>
	706 13 10

KINMONTH GOLD QUACH FUND—

£46, 13s. 6d. 3½ per cent War Loan, at 103½	£48 5 7
Sum on Deposit Receipt with British Linen Bank	4 15 0
Sum on Current Account with British Linen Bank	1 12 8
	<hr/>
	54 13 3

AMOUNT OF SPECIAL FUNDS . . . **£4,459 8 4**

EDINBURGH, 5th January 1944.—As Auditor of the Highland and Agricultural Society of Scotland, I have examined the Securities for the Investments as detailed in the above State of the Funds and have found them in order. The Titles to the Heritable Estate and the Bond for Sum lent on Heritable Security are certified by the Society's Law Agents to be in order.

GEO. JAMES GREGOR, C.A.

HOME, Treasurer.

R. F. BREBNER, Chairman of Board of Directors.

ABSTRACT of the ACCOUNTS of the HIGHLAND and

CHARGE.

1. BALANCES at 30th November 1942	£562 0 3	
2. ARREARS of Subscriptions outstanding at 30th November 1942	£282 8 0	
Whereof due by Members who have compounded for life, and whose arrears are thereby extinguished.	39 0 0	243 8 0
3. INTEREST AND DIVIDENDS—		
(1) Interest—		
On Heritable Bond, less Income-tax	£40 12 6	
On Railway Debenture and Preference Stocks, do.	867 0 8	
On Colonial Government Stocks, do.	109 12 0	
On British Government Stocks, do.	1,573 0 0	
On Mortgage, do.	100 0 0	
On Temporary Loans, do.	15 0 1	
	£2,705 5 3	
(2) Dividends on Bank Stocks, less Income-tax	886 7 10	3,591 13 1
4. SUBSCRIPTIONS—		
Annual Subscriptions	£1,394 19 0	
Life Subscriptions	1,445 17 0	2,840 16 0
5. 'TRANSACTIONS'—Miscellaneous Sales and other Receipts		43 18 5
6. INCOME-TAX repaid for year to 5th April 1943		2,651 2 0
7. N.D.A. EXAMINATION, 1943—Share of net Receipts		6 8 3
8. N.D.D. EXAMINATION at Ayr, 1942—Refund of Expenses		158 0 9
9. MISCELLANEOUS		25 0 0
SUM OF CHARGE	£10,152 6 9	

EDINBURGH, 5th January 1944.—As Auditor of the Highland and Agricultural of the Society for the year ending 30th November 1943 and have found them to be Accounts I have prepared an Account of Charge and Discharge of the Intromissions 1943, of which the above is an Abstract.

AGRICULTURAL SOCIETY of SCOTLAND for Year 1942-1943.**DISCHARGE.**

1. ESTABLISHMENT EXPENSES—			
Salaries and Wages and Allowance for Cleaning	£3,376	17	4
Allowance to Mrs Cowie	100	0	0
Fee-duty, £14, 11s. 8d. ; Rates and Taxes, £109, 14s. 0d.	124	5	8
Coal, Gas, and Electric Light	78	14	4
Insurances, £73, 5s. 3d. ; War Damage Insurance (Business), £64, 12s. 0d. ; Special Annuity Premium, £51, 3s. 9d. ; Superannuation Scheme, £130, 6s. 0d. ; Telephone and Telegrams, £38, 10s. 3d. ; Repairs and Furnishings, £52, 17s. 10d.	410	15	1
	£4,090	12	5
2. FEE to Auditor of Accounts for 1941-1942	120	0	0
3. CHEMICAL DEPARTMENT—			
Fee to Chemist	100	0	0
Analyses for Members and Expenses	189	15	7
	289	15	7
4. VETERINARY DEPARTMENT—Medals to Students	50	16	8
5. DAIRY DEPARTMENT—N.D.D. Examination, 1942	99	6	4
6. DAIRY DEPARTMENT, 1943—			
Expenses of N.D.D. Examination held at Ayr	£285	7	11
Less Entry Fees	126	10	6
	158	17	5
7. SOCIETY'S 'TRANSACTIONS'	1,266	10	3
8. ORDINARY Printing, £88, 5s. 9d. ; Advertising, £42, 14s. 3d. ; Stationery, Books, &c., £111, 0s. 10d. ; Postages and Receipt Stamps, £107, 0s. 0d.	349	0	10
9. RETIRING Allowance to Professor Stanfield, Consulting Engineer	150	0	0
10. MISCELLANEOUS Payments	192	17	0
11. GRANTS to Local Societies, 1942	289	6	8
12. CERTIFICATES and Medals for Long Service	62	4	10
13. SPECIAL GRANTS—			
Animal Diseases Research Association, £200 ; Glasgow Veterinary College, £150 ; Royal Scottish Agricultural Benevolent Institution, £100 ; Scottish Agricultural Organisation Society, £100 ; Scottish Red Cross Agriculture Fund, £147, 19s. 7d. ; other Grants, £157, 12s. 0d.	855	11	7
14. EXPENSES in connection with Show Plant, &c.	71	11	0
15. PLACED on Deposit Receipt	1,500	0	0
16. ARREARS removed from Subscription List at 30th November 1943	101	1	6
17. ARREARS of Subscriptions outstanding at 30th November 1943	173	19	6
18. BALANCES at 30th November 1943—			
On Account Current with Royal Bank of Scotland—			
Edinburgh Account	£337	10	0
In hands of Secretary	38	5	2
	375	15	2
SUM OF DISCHARGE	£10,152	6	9

Society of Scotland, I beg to report that I have examined the Books and Accounts correctly stated and sufficiently vouched and instructed. From the Books and of the Treasurer with the Funds of the Society for the year ending 30th November
GEO. JAMES GREGOR, C.A.

HOME, Treasurer.

R. F. BREBNER, Chairman of Board of Directors.

ABSTRACT of the ACCOUNTS of the CHARGE.

I. FUNDS at 30th November 1942—

£3,198 London and North-Eastern Railway Company 3 per cent Debenture Stock	£2,650 0 0
£5,551, 16s. 3d. 3½ per cent Conversion Stock	4,216 18 2
£500 Queensland 3½ per cent Inscribed Stock, 1950-70	450 1 0
£412 London Midland and Scottish Railway Company 4 per cent Debenture Stock	611 10 6
£190 London Midland and Scottish Railway Company 4 per cent Guaranteed Stock	259 1 11
£400 3 per cent Savings Bonds, "A," 1955-65	400 0 0
	<hr/> £8,587 11 7

BALANCES with Royal Bank of Scotland—

On Account Current	£65 14 4
On Deposit Receipt	196 3 9
	<hr/> 261 18 1
	<hr/> £8,849 9 8

II. INTEREST ON INVESTMENTS—

On £3,198 London and North-Eastern Railway Company 3 per
cent Debenture Stock, for year to 30th June 1943 £95 15 10

Less tax 47 17 11

£47 17 11

On £5,551, 16s. 3d. 3½ per cent Conversion Stock,
for year to 1st October 1943 £194 6 2

Less tax 97 3 0

97 3 2

On £500 Queensland 3½ per cent Inscribed Stock,
1950-70, for year to 1st July 1943 £17 10 0

Less tax 8 15 0

8 15 0

On £412 London Midland and Scottish Rail-
way Company 4 per cent Debenture Stock, for
year to 30th June 1943 £16 9 6

Less tax 8 4 8

8 4 10

On £190 London Midland and Scottish Rail-
way Company 4 per cent Guaranteed Stock,
for year to 30th June 1943 £7 12 0

Less tax 3 16 0

3 16 0

On £400 3 per cent Savings Bonds, "A,"
1955-65, for year to 15th August
1943 £12 0 0

Less tax 6 0 0

6 0 0

171 16 11

III. INTEREST ON DEPOSIT RECEIPT

0 1 10

IV. INCOME-TAX repaid for year to 5th April 1943

171 16 7

SUM OF CHARGE

£9,193 5 0

ARGYLL NAVAL FUND for the Year 1942-1943.

DISCHARGE.

I. ALLOWANCES to seven Recipients as follows :—

4 at £40 each	.	.	.	.	.	£160	0	0
3 at £20 each	.	.	.	.	.	60	0	0
							£220	0 0

II. EXPENSES of Administration—

Advertising Vacancies on List of Beneficiaries	.	.	.	19	9	6
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III. FUNDS at 30th November 1943—

£3,198 London and North-Eastern Railway Company 3 per cent Debenture Stock	.	£2,650	0	0
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£5,551, 16s. 3d. 3½ per cent Conversion Stock	.	4,216	18	2
---	---	-------	----	---

£500 Queensland 3½ per cent Inscribed Stock, 1950-70	450	1	0
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£412 London Midland and Scottish Railway Company 4 per cent Debenture Stock	.	611	10	6
--	---	-----	----	---

£190 London Midland and Scottish Railway Company 4 per cent Guaranteed Stock	.	259	1	11
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£400 3 per cent Savings Bonds, "A," 1955 65	.	400	0	0
		£8,587	11	7

Note.—The above Funds are entered at cost price. The market value at 30th November 1943 was £9,976, 1s. 7d.

Balances with Royal Bank of Scotland—

On Account Current	.	£51	3	11
On Deposit Receipt	.	315	0	0
		366	3	11
			8,953	15 6

SUM OF DISCHARGE . . . £9,193 5 0

HOME, *Treasurer.*
R. F. BREBNER, *Chairman of Board of Directors.*
GEO. JAMES GREGOR, C.A., *Auditor.*

VIEW OF RECEIPTS AND PAYMENTS for Year 1942-1943.

RECEIPTS.

INTEREST AND DIVIDENDS	£3,591 13 1
INCOME TAX REPAYED for year to 5th April 1943	2,681 2 0
	£6,272 15 1
ANNUAL SUBSCRIPTIONS AND ARREARS received	1,358 6 0
	£7,631 1 1

PAYMENTS.

ESTABLISHMENT EXPENSES (see page 173)	£4,090 12 5
FEE TO AUDITOR for 1941-1942	120 0 0
CHEMICAL DEPARTMENT	239 15 7
VETERINARY DEPARTMENT	50 16 8
EDUCATION	93 14 9
RETIRING ALLOWANCE TO CONSULTING ENGINEER	150 0 0
SOCIETY'S 'TRANSACTIONS'	1,222 11 10
ORDINARY Printing, Stationery, Advertising, and Miscellaneous Accounts	588 8 10
GRANTS TO LOCAL SOCIETIES, &c.	351 11 6
	£6,907 11 7

Extraordinary Expenditure—

Special Grants (see page 173)	855 11 7	
		7,763 3 2
DEFICIT		£132 2 1

Extraordinary Income—

Life Subscriptions	1,445 17 0
EXCESS OF RECEIPTS	£1,313 14 11

HOME. *Treasurer.*R. F. BREBNER, *Chairman of Board of Directors.*GEO. JAMES GREGOR, C.A., *Auditor.*

EDINBURGH, 5th January 1944.

PROCEEDINGS AT BOARD MEETINGS.

MEETING OF DIRECTORS, 7TH APRIL 1943.

Major R. F. BREBNER, The Leuchold, Dalmeny House, Edinburgh, in the Chair.

Present.—Ordinary Directors—Major R. F. Brebner; Mr W. J. Campbell; Mr Alexander Clark; Mr Peter Gordon; Mr George Grant; Mr James Hope; Mr J. E. Korr; Mr James R. Lumsden; Mr Alexander Murdoch; Mr James Paton; Major Robert W. Sharpe. *Extraordinary Directors*—Mr R. Scott Aiton; Mr J. W. Alexander, M.V.O.; Mr Alexander Cormack; Mr A. W. Montgomerie. *Treasurer*—The Earl of Home, K.T.

Advisory Council on Education.

A letter, dated 4th March, from the Advisory Council on Education in Scotland was read, inviting the Society to submit its views on certain educational problems which were detailed in the letter.

It was agreed to remit the letter to the Education Committee for consideration and report. The names of Major R. W. Sharpe and Mr James Paton were added to the Committee for that purpose.

Animal Diseases Research Association.

A letter was submitted from the Secretary of the Animal Diseases Research Association inviting the Society to nominate a Special Director on the Board of the Association.

Mr Alexander Murdoch moved that Major R. F. Brebner be nominated for the appointment, and this was unanimously agreed to.

Inspection of Growing Crops of Potatoes.

Mr James Paton, Kirkness, Glencraig, and Mr James Hope, East Barns, Dunbar, submitted Reports on the Proceedings at a Conference in connection with the Scheme for the Inspection of Growing Crops of Potatoes, held at St Andrew's House, Edinburgh, on 28th January.

In speaking to the reports, Mr Paton said that the Ministry's proposal for simplification of the designations was a sound one, provided it carried with it a uniformity of standard of inspection. They were all agreed that the standard of Scottish potatoes was higher than in England and the other countries. The inspection had reached a very high standard, and until England and the other countries came up to the same inspection standard, he thought they should adhere to their old designations.

The Chairman said they were much indebted to Mr Paton and Mr Hope for their encouraging reports, so far as Scottish Seed Potatoes were concerned.

Future of Agriculture.

A Minute of Meeting of the Agricultural Policy Committee, dated 6th April, was submitted and approved.

The Minute stated that the Committee had continued to give consideration to the question of a scheme of Post-war Agriculture for Scotland, and that some progress had been made with the drafting of a report. A further Meeting of the Committee would be held on 5th May.

Treatment of Swill.

The Secretary read a further communication from the Scottish Shorthorn Breeders' Association with regard to the treatment and sterilisation of swill. The Association had written to the Ministry of Agriculture, requesting that the Ministry approach the War Office with a view to an Order being made by them to put all camp dogs under proper and adequate control, as such dogs were too often free to hunt over adjoining farm

fields and were a potential source of foot-and-mouth disease infection. The Association had also urged that an Order be introduced immediately to make compulsory the treatment and sterilisation of all swill at the source of its production.

Mr R. Scott Aiton, Legerwood, Earlstoun, said that these camp dogs were a perfect menace to Border sheep farmers. The dogs were continually hunting over the surrounding farms, and did much damage to stock by disturbance, especially to lambing ewes. Many Border farmers, he said, had lost valuable ewes through this cause.

From the discussion which followed, it was evident that the trouble was not peculiar to the Border district, but was equally serious throughout the country.

It was eventually decided that a letter be written to the Department of Agriculture for Scotland, requesting the Department to take appropriate action with a view to securing that all camp dogs were put under proper and adequate control. It was further decided to point out that the complaint applied to all classes of military camps, including the Royal Air Force and the Polish Army.

Animal Diseases Research Association.

An application was submitted from the Animal Diseases Research Association for a renewal of the grant of £200 for the current year.

On the recommendation of the Finance Committee, it was agreed that the grant be renewed.

Glasgow Veterinary College.

An application from the Glasgow Veterinary College was submitted, asking for a renewal of the grant of £100 for the current year, or, if possible, an increase.

On the recommendation of the Finance Committee, it was decided that a grant of £150 be given for the year 1943.

Finance.

A Minute of Meeting of Finance Committee, dated 7th April, was submitted and approved.

The Minute dealt, *inter alia*, with the following matters:—

Scottish Red Cross Agriculture Fund.—The Committee recommended that the expenses incurred in connection with the activities of the Scottish Red Cross Agriculture Fund Committee, during its third year, amounting to a sum of £147, 19s. 7d., be defrayed by the Society.

Guild of Agricultural Journalists.—The Committee recommended that a grant of £10, 10s. be given to the Guild of Agricultural Journalists in aid of its Educational Activities, which were directed towards encouraging young men and women to make a comprehensive study of Farming and Journalism with a view to adopting Agricultural Journalism as a career.

MEETING OF DIRECTORS, 2ND JUNE 1943.

Major R. F. BREBNER, The Leuchold, Dalmeny House, Edinburgh, in the Chair.

Present.—Ordinary Directors—Major R. F. Brebner; Mr William Brown; Mr W. J. Campbell; Mr Alexander Clark; Mr Peter Gordon; Mr George Grant; Mr James Hope; Mr James Kilpatrick; Mr William H. Lawson; Mr James R. Lumsden; Mr Thomas M'Lay; Mr Alexander Murdoch; Mr James Paton; Mr John N. Reid; Sir Joshua Ross-Taylor; Mr G. H. Russell; Major Robert W. Sharpe; Mr John P. Sleigh; Mr Matthew Templeton; Mr James Wyllie. *Extraordinary Directors*—Mr R. Scott Aiton; Mr David Blair; Mr Ian M. Campbell; Mr Alexander Cormack; Mr James Durno; Mr A. W. Montgomerie; Major Sir Samuel Strang Steel, Bt. *Treasurer*—The Earl of Home, K.T.

The late Duke of Portland, K.G.

Before proceeding with the business of the Meeting the Chairman referred, with profound regret, to the death of the President of the Society, the Duke of Portland. His Grace, whose membership of the Society, he said, dated back to 1881, occupied the Presidential Chair on several occasions. The first of these was so long ago as 1888, in which year the Annual Show was held at Glasgow.

His Grace's second term of office as President was in 1932, on the occasion of the Show held that year at Inverness, and he was again elected to that office in 1940 in anticipation of the Show which should have taken place at Inverness that year. He

continued in the office of President up till the date of his death, and they had looked forward to his occupying that position when the next Show was held at Inverness after the war.

The Duke of Portland was an extensive landowner in Scotland as well as in England, and, as such, took a keen interest in all affairs pertaining to agriculture and in the management of his estates. He was a popular landlord, and took a personal interest in the welfare of his tenants, by whom he was held in high esteem. At his Home Farm in Caithness he was a successful breeder of North Country Cheviot Sheep, Aberdeen-Angus Cattle, and Clydesdale Horses. Stock bred there won many prizes at local and at Highland Shows. The Society was honoured by his acceptance of the office of President, and his death was a loss to the Society and to the country which they deeply deplored.

A Minute of regret and sympathy was submitted and adopted, the members present upstanding, and the Secretary was instructed to forward a copy to the Duchess of Portland.

The late Mr William Hodge, Slodahill.

The Chairman said it was also with deep regret that he had to refer to the death of Mr William Hodge, Slodahill, Lockerbie. Mr Hodge, he said, was one of the best-known agriculturists in the South of Scotland. He was a noted breeder of Ayrshire Cattle and Clydesdale Horses, and his exhibits gained many awards at both local and National Shows. He served on many public bodies and had a wide circle of friends, by all of whom he was held in the highest respect and esteem. His election as a Director took place only in the preceding year, and he attended only one Meeting of the Board—in November 1942. He, however, rendered a valuable service to the Scottish Red Cross Agriculture Fund when he acted as Chairman of the Lockerbie Area Committee, which raised a large sum last year in aid of the Fund. His death was a loss to the Society which they deeply regretted.

A Minute of regret and sympathy was submitted and adopted, the members present upstanding, and the Secretary was instructed to forward a copy to the family of the deceased.

Congratulations to Major R. W. Sharpe, C.B.E.

The Chairman said he wished, in his own name and in name of the Directors, to offer their very sincere congratulations to Major Sharpe on the honour of Commander of the Order of the British Empire (C.B.E.) conferred upon him by His Majesty the King. Major Sharpe, he said, had long been a valued member of that Board, and he was sure they were all agreed that no one was more worthy of the honour.

Major Sharpe expressed his thanks to the Chairman and the members of the Board.

Scottish Red Cross Agriculture Fund.

The Chairman said the Report on the activities of the Scottish Red Cross Agriculture Fund Committee during its third year—17th April 1942 to 16th April 1943—had been circulated to members of the Board. As the Report would be submitted to the Half-yearly General Meeting that afternoon, he did not propose to deal with it there. (For full details, see Report of Half-yearly General Meeting of 2nd June 1943.)

Grants Confirmed.

On the motion of the Treasurer, the Earl of Home, K.T., the following proposed grants, approved of at last Meeting, were confirmed:—

Animal Diseases Research Association—£200 for the current year.

Glasgow Veterinary College.—£150 for the current year.

Guild of Agricultural Journalists.—£10, 10s. in aid of its educational activities.

Advisory Council on Education.

A Minute of Meeting of Education Committee, dated 2nd June 1943, was read and approved.

The Minute stated that, in accordance with the remit from the Board, the Committee had considered a letter, dated 4th March, from the Advisory Council on Education in Scotland. In that letter the Advisory Council stated that the Secretary of State for Scotland had made certain remits to the Council, of which details were given. The letter continued that, should the Society have any views or opinions to submit, the Council would be glad to receive them.

After careful consideration, the Committee had decided to recommend that the Directors do not submit any views or opinions on the problems referred to.

Office-bearers for 1943-44.

A Minute of Meeting of Office-bearers Committee, dated 5th May, was submitted and approved.

The Minute dealt with the following appointments :—

President.—In view of the death of the President, the late Duke of Portland, it was unanimously recommended that Sir Donald W. Cameron of Lochiel, K.T., be invited to accept office as President of the Society.

Extraordinary Director.—A letter had been submitted from Mr T. G. Wilson, Carbeth Home Farm, intimating that, on account of his numerous other engagements and consequent difficulty in attending Meetings of the Board, he had decided not to accept nomination as an Extraordinary Director for another year. The Committee had unanimously decided to nominate Mr Finlay MacGillivray of Aldie, Tain, as an Extraordinary Director to fill the vacancy.

Finance.

A Minute of Meeting of Finance Committee, dated 2nd June, was submitted and approved.

The Minute dealt, *inter alia*, with the following matters :—

Scottish Association of Young Farmers' Clubs.—The Committee had given further consideration to the application for a grant from the Scottish Association of Young Farmers' Clubs, and had decided to recommend that a grant of £50 be given, it being a condition that this sum should be earmarked for the Capital Fund which the Association was endeavouring to establish.

Edinburgh Highland Reel and Strathspey Society.—It was recommended that the grant of £50, together with the additional grant of £25 given during the past three years, be renewed for the current year.

Empire Exhibition, Scotland, 1938.—The Secretary reported that a refund of £25 had been received from the Liquidator of the Empire Exhibition, Scotland, 1938, being 6d. per £ on the amount of the Society's guarantee of £1000.

Future of Agriculture.

A Memorandum prepared by the Special Committee on Post-war Agriculture was submitted and considered in detail. Various emendations were given effect to, and suggestions were made for further consideration by the Special Committee.

It was agreed that, after the Special Committee had made its final adjustments, the Memorandum should be circulated to members of the Board with a view to securing their approval or further observations within a limited time. After these had been considered and disposed of, the Memorandum would be printed and published.

On the motion of Sir Joshua Ross-Taylor, the Chairman was accorded a hearty vote of thanks for the great amount of work which he had devoted to the preparation of the Memorandum.

MEETING OF DIRECTORS, 3RD NOVEMBER 1943.

Major R. F. BREBNER, The Leuchold, Dalmeny House, Edinburgh, in the Chair.

Present.—*Ordinary Directors*—Mr R. Scott Aiton; Major R. F. Brehner; Mr Ian M. Campbell; Mr W. J. Campbell; The Earl of Elgin and Kincardine, K.T., C.M.G.; Mr Alexander Forbes; Mr William H. Lawson; Mr James R. Lumsden; Mr Alexander Murdoch; Mr James Paton; Sir Joshua Ross-Taylor; Major Robert W. Sharpe, C.B.E.; Mr W. D. Simpson; Mr John P. Sleigh; Mr J. Faed Sproat; Mr Matthew Templeton; Mr James Wither; Mr James Wyllie. *Extraordinary Directors*—Mr J. W. Alexander, M.V.O.; Mr Peter Gordon; Mr George Grant; Mr Thomas Hutchison; Mr Finlay MacGillivray; Captain Ian S. Robertson. *Treasurer*—The Earl of Home, K.T.

The late Mr T. Mercer Sharp.

Before proceeding with the business of the Meeting, the Chairman referred, with very deep regret, to the death of a member of the Board, Mr T. Mercer Sharp, Bardrill, Blackford.

Mr Mercer Sharp, he said, joined the Society in 1900, and was elected a Director in 1929, since when he had been continuously on the Board. He took a keen interest

in the work of the Society, and was a familiar figure at the Annual Shows, at which he rendered valuable services to the Society as a Steward for many years.

Mr Sharp took a leading part in agricultural affairs in his own district. As a breeder and successful exhibitor of Clydesdale horses he was well known and respected throughout a wide area. His services were much sought after as a Judge of Clydesdales, and he officiated in that capacity at Shows all over the country. His kindly and genial disposition, and shrewd judgment, earned for him the respect and esteem of a large circle of friends, by whom he would be sadly missed. His death was a loss to the Society which they deeply regretted.

A Minute of regret and sympathy was submitted and adopted, the members present upstanding, and the Secretary was instructed to forward a copy to the family of the deceased.

Chairman of the Board for 1943-44.

Sir Joshua Ross-Taylor, Mungoswalls, Duns, moved that Major R. F. Brebner, The Leuchold, Dalmeny House, Edinburgh, be re-elected Chairman of the Board of Directors for another year. In doing so, Sir Joshua said they hoped that Major Brebner would continue in the Chair during the War period, and for at least one Show after the War.

The Motion was unanimously adopted, and Major Brebner was re-elected Chairman of the Board for the ensuing year.

In agreeing to accept office, Major Brebner thanked the Directors for the honour they had again done him.

Scottish Red Cross Agriculture Fund.

The Secretary submitted the following Report on the progress of the Fund during the period from 16th April 1943, the close of the third year's activities, up to that date.

The Report stated that between 17th April and that date a sum of £15,492, 6s. 1d. had been received, comprising Free Gift Sales, Levies and Collections by Area Committees, £6522, 3s. 6d.; Victory Garden Shows and Sales, £5052, 10s. 5d.; Farm Workers' Contributions, £158, 9s. 11d.; and Other Contributions, £3759, 2s. 3d.

The Earl of Home, K.T., in moving adoption of the Report, said it was a very satisfactory one. The whole agricultural community, he said, were doing their very best on behalf of the Fund.

The Chairman emphasised the necessity for all possible support to the Fund. The question of sending parcels to Prisoners-of-War in Japan had been engaging the attention of the Red Cross. If such facilities became available, it would entail a heavy additional burden on the Red Cross, estimated at something like £3,000,000 per annum. The Committee recently had written to all the Cattle Breed Societies suggesting that they might promote Pedigree Stock Sales in aid of the Fund. So far, encouraging promises had been received, particularly from the Ayrshire Cattle Society.

Post-war Agriculture.

A Memorandum by the Board of Directors on Post-war Agriculture, as finally revised by the Special Committee appointed for that purpose, was submitted.

The Chairman said the Memorandum did not go into minute detail, but set forth in the shortest possible terms what they considered necessary to secure a stable Agriculture. They had not gone into the international viewpoint, which would have to be considered in any scheme of post-war Agriculture, particularly in view of the Atlantic Charter and the Conferences at Hot Springs and Moscow. The Committee felt it was not their function to deal with these matters, but the function of the Government.

After dealing with certain suggestions made by members of the Board since last Meeting, the Chairman referred to Agricultural Education and Research. He directed attention to a recent debate in the House of Lords on the effect of the present system of forcing crops on the health of the community. He hoped this question would be studied by the Agricultural Research Council. There was an enormous field to be explored, not so much with regard to the cure of disease as in respect of the cause of it.

Mr W. J. Campbell, Edinburgh, said he was glad that the Chairman had referred to the debate in the House of Lords. He referred to instances of derelict farms which, through live-stock, cultivation, and the use of organic manures, had become self-supporting. Disease had been eliminated, and healthy stock and crops produced healthy food, which meant health for the people. Health of soil, plant, and animal were inter-dependent, and the refertilisation of the soil could best be accomplished by the agencies of animal excreta acting upon decaying vegetation of the farm to form humus. Chemical manures containing nitrogen stimulated the crop but impoverished the soil. The Society should call upon the Secretary of State to begin investigating the important subject of humus-fertile land on a comprehensive scale as soon as possible.

The Memorandum was approved, and it was agreed that copies be sent to the Secretary of State for Scotland, the Department of Agriculture for Scotland, and Scottish Members of Parliament.

On the motion of Mr James R. Lumsden of Arden, the Chairman was cordially thanked for the great amount of work he had devoted to the preparation of the Memorandum.

'Transactions.'

A Minute of Meeting of Publications Committee, dated 3rd November, was read and approved.

The Minute stated that the Committee had considered the question of issuing a volume of 'Transactions' in 1944. The total cost of the last volume was £1210, but increased wages in the printing and binding trades would entail an increase of £80 in 1944. In view of the unavoidable absence of the Convener of the Committee, Colonel Carruthers, it was decided to defer a final decision until a later Meeting.

Artificial Insemination.

A letter was submitted from the Department of Agriculture for Scotland stating that the Agricultural Improvement Council for Scotland had decided to appoint a Supervisory Committee to advise on the promotion and control of artificial insemination, and to assist in the supervision of an experimental centre which it was proposed to set up in Scotland. It was intended that the Committee should be representative of scientific, veterinary, and farming interests. The Society was invited to nominate two representatives to act as members of the Committee.

Mr W. H. Lawson, Frithfield, Anstruther, moved, and Mr J. W. Alexander, Golffhill, Moffat, seconded, that representatives be appointed.

Mr Alexander Murdoch, East Hallside, Cambuslang, said that at a previous Meeting they had declared against artificial insemination, and he moved, as an amendment, that no action be taken. Mr John P. Sleight of St John's Wells, Fyvie, seconded.

On a vote being taken, six supported the amendment, and the motion was duly carried.

Major R. F. Brebner, The Leuchold, Dalmeny House, Edinburgh, and Mr Finlay MacGillivray, Greenhead, Pencaitland, were appointed the Society's representatives on the Committee.

Farm Buildings.

A letter was submitted from the Secretary of a Committee appointed by the Secretary of State for Scotland to consider and make recommendations regarding the layout, design, and construction of farm buildings after the war. The letter detailed the lines of inquiry proposed to be followed, and said the Committee would welcome the Society's views on the subject.

Major R. W. Sharpe, The Park, Earlstoun, moved that the Society give evidence. He pointed out that one of the greatest drawbacks to Agriculture was the derelict state of so many farm steadings. If some method could be found to make them up-to-date and labour-saving it would be a great help to Agriculture. In far too many cases valuable machinery had to be left out, at the mercy of the weather, for lack of accommodation.

Mr J. W. Alexander, M.V.O., Golffhill, Moffat, seconded, and the motion was adopted.

The following were appointed a Committee to consider and prepare the evidence to be submitted: Mr J. W. Alexander, Major R. F. Brebner, Mr Alexander Forbes, Mr James Paton, Major R. W. Sharpe, Mr W. D. Simpson, Mr James Wither.

Proposed Demonstration of New Implements.

The Chairman stated that Sir Joshua Ross-Taylor, Convener of the Implements Committee, had suggested that the Society hold two demonstrations of the latest implements—one in the early summer and the other in the autumn of next year. The proposal was remitted to the Implements Committee for consideration, and, if so decided, to make the necessary arrangements.

Finance.

A Minute of Meeting of Committee, dated 3rd November, was submitted and approved.

The Minute dealt, *inter alia*, with the following matters:—

Members' Subscriptions.—The Secretary reported that, at that date, the amount received from members in Life subscriptions exceeded the amount at the corresponding date last year by over £262. There was, however, a falling-off in Annual subscriptions of £240.

Scottish Agricultural Organisation Society Ltd.—It was recommended that the grant of £100 to the Scottish Agricultural Organisation Society be again renewed for the year 1944.

Royal Scottish Agricultural Benevolent Institution.—It was recommended that the grant of £100 to the Royal Scottish Agricultural Benevolent Institution be renewed for the year 1944.

Show Plant.—It was recommended that the Insurance on the Society's Show Plant, stored at Inverness, be increased by fifty per cent, in view of the increased cost of replacement in case of destruction by fire.

MEETING OF DIRECTORS, 5TH JANUARY 1944.

Major R. F. BREBNER, C.B.E., The Leuchold, Dalmeny House, Edinburgh, in the Chair.

Present.—Ordinary Directors—Mr R. Scott Aiton; Major R. F. Brebner, C.B.E.; Captain James Craig; Mr Alexander Forbes; Mr A. W. Howison; Mr J. E. Kerr; Mr John Kerr; Mr William H. Lawson; Mr James R. Lumsden; Mr Alexander Murdoch; Mr John N. Reid; Sir Joshua Ross-Taylor; Mr G. H. Russell; Mr W. D. Simpson; Mr James Wither; Mr James Wyllie. *Extraordinary Directors*—Mr James Durno; Mr Peter Gordon; Mr George Grant; Mr Thomas Hutchison; Mr Finlay MacGillivray. *Treasurer*—The Earl of Home, K.T. *Auditor*—Mr George James Gregor, C.A.

The late Major Robert W. Sharpe, C.B.E.

Before proceeding with the business of the Meeting, the Chairman said it was with the deepest regret that he had to refer to the loss of an esteemed colleague on the Board, Major Robert W. Sharpe, C.B.E., of The Park, Earlston, whose death occurred with tragic suddenness on 6th December.

Major Sharpe, he said, joined the Society in 1910 and was elected a Director in 1923. From the date of his joining the Board he took a keen and practical interest in every department of the Society's work. He was an active member of the various Standing Committees, and since 1932 was Convener of the Science Committee. He rendered valuable services to the Society in connection with the Annual Shows, acting as a Steward for many years, and was Convener of the Shows Committee of the last Border Show at Melrose in 1936. In all these activities his practical knowledge and sound judgment were fully recognised and appreciated by his fellow-members of the Board. He was a member of the Special Committee on Post-war Agriculture which reported at last Meeting of the Board, was present at all the Meetings of that Committee, and took a leading part in formulating the conclusions arrived at by the Committee.

Besides his work for the Society, Major Sharpe rendered valuable services to the country in many other spheres of activity. He had a distinguished career as an Officer of the K.O.S.B. in the last War, during which he was twice wounded. In the County of Berwick he rendered notable service in many departments of public work, in each of which he took a leading part and gave unsparingly of his time and energy. He was Chairman of the Agricultural Executive Committee of Berwickshire, Chairman of the Road Board, and A.R.P. Controller for the County.

His many public services were recognised in June of last year when His Majesty the King conferred upon him the honour of C.B.E.

Major Sharpe's death was a loss which would be deplored by Agriculturists throughout Scotland, and was especially a grievous loss to that Society and to the members of that Board, by whom the memory of his outstanding qualities and cheerful and kindly disposition would long be remembered.

A Minute of regret and sympathy was submitted and adopted, the members present upstanding, and the Secretary was instructed to forward a copy to the widow and family of the deceased.

The late Mr Alexander Cowan.

The Chairman said it was also with deep regret that he had to refer to the death of Mr Alexander Cowan of Valleyfield, Penicuik.

Mr Cowan, he said, was a member of the Society for over thirty years and served as a Director from 1917 to 1923. Whilst actively engaged in the business of papermaking, as head of the firm of Alexander Cowan & Sons, Limited, Penicuik, he took a keen interest in agricultural affairs and devoted much attention to the management of his property of Loganhouse, and was, besides, a keen botanist. He was especially interested in Black-face sheep, of which he was an enthusiastic breeder.

Mr Cowan rendered valuable services on many public bodies, including the County Council of Midlothian and the Town Council of Penicuik, of which he was Provost for a considerable period. His genial personality and kindly disposition earned the regard and esteem of a wide circle of friends, by whom his death would be deeply regretted.

A Minute of regret and sympathy was submitted and adopted, the members present upstanding, and the Secretary was instructed to forward a copy to the widow of the deceased.

Congratulations to Major R. F. Brebner, C.B.E.

Sir Joshua Ross-Taylor, Mungoswells, Duns, said he thought they could not begin the business of the Meeting that day without referring to the honour which His Majesty the King had conferred upon their Chairman. He did not think that amongst the list of those who had received honours any name could have given greater pleasure than that of Major Brebner, who received the honour of Commander of the Order of the British Empire (C.B.E.). Major Brebner had thrown himself whole-heartedly into the work and interests of agriculture, and it was no doubt on account of his work for agriculture that he had been given that honour. He moved that they record in the Minutes their appreciation of the honour which Major Brebner had received, and extend to him their cordial congratulations. This Motion was unanimously adopted.

Major R. F. Brebner expressed his thanks to Sir Joshua Ross-Taylor and the members of the Board.

Congratulations to Mr T. G. Wilson.

The Chairman then moved that they offer their sincere congratulations to Mr T. G. Wilson, Carbeth Home Farm, Balfron Station, whose name appeared in the recent Honours List as receiving a Knighthood.

This Motion was unanimously adopted, and the Secretary was instructed to write accordingly to Mr Wilson.

Artificial Insemination.

Mr Alexander Murdoch, East Hallside, Cambuslang, said he took exception to the word "promotion" in the previous Minute nominating two representatives of the Society on the Committee appointed by the Agricultural Improvement Council for Scotland. He did not object to a Committee being appointed to control and supervise Artificial Insemination, but he wished to make it perfectly clear that the Directors were not committed to its promotion.

The Chairman said it was unfortunate that, in the communication from the Department of Agriculture, it was stated that the Committee to be appointed was "to advise on the promotion and control of artificial insemination." Actually the terms of reference to the Committee were with regard to supervision and not promotion. He considered it was not before time that steps should be taken to supervise artificial insemination.

It was agreed that Mr Murdoch's objection be entered in the Minutes.

Vacancies on Board.

On behalf of the Ordinary Directors in the Dumfries Show Division, Mr James Wyllie, Dumfries, moved that Mr J. W. Alexander, M.V.O., of Newton, Golflhill, Moffat, be nominated at the Half-yearly General Meeting that afternoon as an Ordinary Director to fill the vacancy caused by the death of the late Mr William Hodge, Slodahill.

On behalf of the Ordinary Directors in the Stirling Show Division, Mr J. E. Kerr of Harviestoun, Dollar, moved that Mr Robert W. Meikle, Bearcrofts, Grangemouth, be nominated at the Half-yearly General Meeting that afternoon as an Ordinary Director to fill the vacancy caused by the death of the late Mr T. Mercer Sharp, Bardrill.

The nominations were unanimously approved.

Scottish Agricultural Organisation Society.

On the motion of the Earl of Home, K.T., Treasurer, it was unanimously agreed to confirm the proposed grant of £100 to the Scottish Agricultural Organisation Society for the year 1944.

Royal Scottish Agricultural Benevolent Institution

On the motion of the Earl of Home, K.T., it was also agreed to confirm the proposed grant of £100 to the Royal Scottish Agricultural Benevolent Institution for the year 1944.

Demonstration and Exhibition of New Implements.

A Minute of Meeting of Implements Committee, dated 4th January, was submitted and approved.

The Minute stated that the Committee had considered the remit from the Board regarding the holding of Demonstrations of the latest Farm Implements, and had decided to recommend as follows: (1) That there be a Demonstration in late April, which would include Potato Coverers, Row-crop Implements, Robot Transplanters, and Potato Planters; (2) A Demonstration in the late summer or autumn, which would include Combine Harvesters, anything new in Binders, Beet Lifters, and Potato Lifting Machines. It was suggested that the Spring Demonstration be held in the County of Perth or Angus, and the Autumn Demonstration in the Lothians. Each Demonstration should last for two days, and, at the same time, there should be on exhibition other new and improved Implements which it might not be possible to show in actual operation.

It was further recommended that the following Sub-Committee be appointed to deal with further arrangements: Sir Joshua Ross-Taylor, *Convener*; Major R. F. Brebner, C.B.E.; Mr James Paton; Mr Thomas Hutchison; Mr W. D. Simpson; and Mr Finlay MacGillivray. (Mr T. A. Wedderspoon, Castleton, Eassie, was later co-opted as a Member of the Committee.)

Farm Buildings.

A Minute of Meeting, dated 4th January, of the Special Committee on Farm Buildings, appointed by the Directors on 3rd November, was submitted and approved.

The Minute stated that a preliminary Meeting of the Committee had been held on 4th January, at which a general discussion took place, and the Secretary produced a copy of the Evidence which had been prepared by the Scottish Branch of the Land Agents' Society. A copy of that Evidence was being circulated to each member of the Special Committee with a view to further consideration.

'Transactions.'

A Minute of Meeting of Publications Committee, dated 5th January, was read and approved.

The Minute stated that the Committee had again considered the question of the publication of a volume of 'Transactions' in 1944, and had decided that a volume should be issued. Some discussion had taken place as to whether it should be issued in a paper binding, or in the usual cloth binding, and, after full consideration, it was decided to recommend that the volume be bound in cloth as in past years.

Finance.

A Minute of Meeting of Finance Committee, dated 5th January, was submitted and approved.

Inter alia the Minute dealt with the following:—

Master of Works.—A letter was submitted from Mr H. Raeside, Master of Works to the Society, intimating that he had received an appointment as Clerk of Works in the Department of the Civil Engineer in Chief, Admiralty, and would commence duty on 3rd January. The appointment was for a period of three years' service in the Indian Ocean Area from the date of taking passage, but, in the first instance, he would take up duties at Rosyth pending embarkation.

In view of the unlikelihood of a Show being held for some time, the Committee had decided, with regret, to recommend that Mr Raeside's appointment as Master of Works to the Society be terminated.

PROCEEDINGS AT GENERAL MEETINGS.

GENERAL MEETING, 2ND JUNE 1943.

The EARL OF HOME, K.T., Treasurer of the Society, in the Chair.

New Members.

The Secretary submitted a list of thirty-seven candidates for election to membership. Those were balloted for and duly elected.

Election of Office-Bearers.

Major R. F. Brebner, Chairman of Directors, moved that the following be elected Office-bearers of the Society for the year 1943-44 :—

President.—Sir Donald W. Cameron of Lochiel, K.T., Achnacarry, Spean Bridge, Inverness-shire.

Vice-Presidents.—The Duke of Sutherland, K.T., P.C., Dunrobin Castle, Golspie ; The Earl of Leven and Melville, K.T., Glenferness House, Nairn.

Ordinary Directors, 1940.—Mr Matthew Templeton, Goshen Bank, Kelso ; Mr James R. Lumsden of Arden, Dumbartonshire ; Mr J. Fæd Sproat, Boreland of Anwoth, Gatehouse, Castle Douglas ; Major R. F. Brebner, The Leuchold, Dalmeny House, Edinburgh ; Major A. D. Campbell, Stanstill, Wick ; Mr James Paton, Kirkness, Glen-craig ; Mr Alexander Murdoch, East Hallside, Cambuslang, Lanarkshire ; Mr G. H. Russell of The Burn, Glenesk, Brechin.

1941.—Mr T. Mercer Sharp, Bardrill, Blackford ; Mr James Wyllie, Beaumont, Victoria Road, Dumfries ; Mr John Kerr, Yorkston, Gorebridge, Midlothian ; Mr Ralph S. MacWilliam, Garguston, Muir of Ord, Ross-shire ; Mr A. W. Howison, Rannagulzion, Blairgowrie ; Mr A. A. Hagart Speirs of Elderslie, Houston House, Renfrewshire ; Mr John P. Sleigh of St John's Wells, Fyvie ; Major R. W. Sharpe, C.B.E., of The Park, Earlstoun.

1942.—Mr W. J. Campbell, 61 Fountainhall Road, Edinburgh ; Mr Francis W. Walker of Leys, Leys Castle, Inverness ; Mr William H. Lawson, Frithfield, Anstruther ; Mr William Brown, Craigton, Bishopton, Renfrewshire ; Mr John N. Reid, Cromley Bank, Ellon ; Sir Joshua Ross-Taylor, Mungoswells, Duns ; Mr J. E. Kerr of Harviestoun, Dollar.

1943.—Mr William D. Simpson, Highfield, North Berwick ; Mr Ian M. Campbell, Bal Blair, Invershin, Sutherland ; The Earl of Elgin and Kincardine, K.T., C.M.G., Broomhall, Dunfermline ; Mr A. W. Montgomery, Westburn Farm, Cambuslang, Lanarkshire ; Mr Alexander Forbes, Rettie, Banff ; Mr R. Scott Aiton, M.C., Legerwood, Earlstoun ; Captain James Craig, Innergeldie, Comrie ; Mr James Wither, Awhirk, Stranraer.

Extraordinary Directors.—Mr J. W. Alexander, M.V.O., of Newton, Golffhill, Moffat ; Mr David Blair, Littleinch, Wormit, Fife ; Mr James Durno, Crichtie, Inverurie ; Mr Finlay MacGillivray of Aldie, Tain ; Mr Alexander Clark, Strathore House, Thornton, Fife ; Mr Peter Gordon, Balcraig Moor, Port William ; Mr George Grant of Glenfarclas, Blackboat ; Mr Thomas Hutchison (Barclay, Ross & Hutchison, Ltd.), 67-71 Green, Aberdeen ; Mr James Kilpatrick, Craigie Mains, Kilmarnock ; Captain Ian S. Robertson, Linkwood, Elgin.

Treasurer.—The Earl of Home, K.T., The Hirsell, Coldstream.

Honorary Secretary.—Colonel F. J. Carruthers, C.B., of Dormont, Lockerbie.

Major R. W. Sharpe, C.B.E., of The Park, Earlstoun, seconded the motion, and the Office-bearers were duly elected.

Special Grants.

The Earl of Home, K.T., Treasurer of the Society, moved approval of the following Special Grants, which were recommended by the Board of Directors:—

- (1) £200, for the current year, to the Animal Diseases Research Association.
- (2) £150, for the current year, to the Glasgow Veterinary College.
- (3) £50, for the current year, to the Edinburgh Highland Reel and Strathspey Society, plus £25 extra war contribution.
- (4) £10, 10s. to the Guild of Agricultural Journalists.
- (5) £50 to the Scottish Association of Young Farmers' Clubs.
- (6) £10 to the Glasgow and West of Scotland Society for the Prevention of Cruelty to Animals.

Mr James R. Lumsden of Arden seconded the motion, and the Special Grants were duly approved.

Scottish Red Cross Agriculture Fund.

Mr James Paton, Kirkness, Glencairn, submitted the following Report on the activities of the Committee during its third year of operations, from 17th April 1942 to 16th April 1943. He said that the Third Annual Report had now been issued. (The full Report appeared on pp. 122-137 of the volume of 'Transactions' for 1943.)

The total amount of contributions received was £151,817, 1s. 6d. To this was added a sum of £132, 2s. 1d., being interest accruing on sums placed on Deposit Receipt for short periods. This gave a total for the year of £151,949, 3s. 7d.

Adding this amount to the sums raised in the first and second years—£115,876, 14s. 2d. in 1940-41 and £109,839, 6s. 10d. in 1941-42—gave a grand total of £377,665, 4s. 7d. raised by the Committee during its three years of activity.

As in the preceding years, the money raised during the third year had been handed over to the Scottish Branch, British Red Cross Society, and the St Andrew's Ambulance Association. The total allocation to the former body, during the three years, was £335,339, 17s., and to the latter, £42,325, 7s. 7d.—in all £377,665, 4s. 7d.

The expenses incurred during the third year, which amounted to a sum of £147, 19s. 7d., had again been defrayed by the Highland and Agricultural Society, which also provided the staff, office accommodation, telephone service, &c., free of charge.

At a Meeting of the General Committee of the Fund, held on 26th May, cordial resolutions of thanks were passed to all those bodies and individuals who had contributed so generously to the remarkable success of the Fund. Grateful acknowledgment was made of the valuable help and co-operation extended to the Committee by the Directors and Members of the Highland and Agricultural Society, and the Society's Secretary and Staff were accorded a warm vote of thanks for the work they had performed in furtherance of the movement.

Lord Kinnaid, Chairman of Council of the Scottish Branch, British Red Cross Society, had said in a letter to the Earl of Home, K.T., Chairman of the Committee of the Fund, "It is difficult to find words in which adequately to convey to you, both our admiration of the work that you and your Committee have done and our gratitude to all the Agricultural community for their very great generosity. This year our share, £144,023, 1s. 7d., is enough to meet a third of the cost of all the weekly food parcels that we are now sending to our Scottish Prisoners of War."

The prospects for the fourth year of operations were encouraging, although it was realised that the high figure reached in the third year would be difficult to maintain. Already contributions had come to hand, including substantial sums of £500 from the Dumfries and District War Charities Agricultural Committee, and £510 from the Vale of Alford Agricultural Association, Aberdeenshire. During this War, Agriculture had raised more money in aid of the Red Cross than any other single industry in the country, and it was confidently believed that in the coming year the agricultural community would continue its splendid effort to provide funds for succouring our sick and wounded in the Forces, and for relieving the hardships and privations of our men who were Prisoners of War.

Lord Home, Chairman of the Fund Committee, added that it had been a wonderful result, and thereafter the Report was approved.

Treatment of Swill.

Mr Peter Gordon, Balraira Moor, Port William, reported that the Directors had continued to urge upon the Department of Agriculture for Scotland the necessity for steps being taken to make compulsory the treatment and sterilisation of all swill at the

source of its production. It had also represented to the Department that camp dogs were a menace to Sheep Farmers, as these dogs were continually hunting over the surrounding farms, and, besides being a potential source of foot-and-mouth disease infection, did much damage to stock by disturbance, especially to lambing ewes. The Department had been asked to take appropriate action with a view to securing that all camp dogs were put under proper and adequate control. The complaint applied to all classes of military camps, including the Royal Air Force and the Polish Army.

The Report was approved.

Continuing, Mr Gordon added that he thought the number of useless dogs in the country was excessive, and that a higher licence tax appeared to be necessary, both in the interests of food conservation and the safeguarding of the country's live stock.

Future of Agriculture.

Major R. F. Brebner, Chairman of Directors, reported that the Special Committee appointed on 2nd April 1941 to consider and report on a scheme of Post-War Agriculture for Scotland had met on six occasions. A draft Memorandum embodying its preliminary findings had now been prepared, and had earlier that day been submitted to the Board of Directors, in Committee.

Major Brebner added that the Directors had had a lengthy discussion on the Memorandum, and that it had been remitted back to the Committee for certain slight modifications.

Agricultural Education.

Sir Joshua Ross-Taylor, Mungoswells, Duns, Chairman of the National Agricultural Examination Board, submitted the following Report on the 45th Examination for the National Diploma in Agriculture :—

At the Examination held at Leeds from 6th to 14th April 1943, 207 candidates presented themselves, as compared with 99 at the Examination held in 1942. Thirty-six candidates were from Scottish centres. As a result of the Examination, 37 Diplomas were awarded. One Honours award was made—the candidate being a student of Glasgow University and the West of Scotland Agricultural College. Of the 207 candidates, 17 appeared for all subjects, and, of these, 7 obtained the Diploma, including the candidate with the Honours award. Forty-eight had passed certain subjects previously, and were completing the Examination on this occasion, and, of these, 30 were successful in obtaining the Diploma. The names of the successful candidates will appear in the 'Transactions.'

The remaining 142 presented themselves for first groups of three, four, or five subjects, and, of these, 71 passed in the subjects for which they appeared and were entitled to appear for the second group of subjects at a subsequent Examination. Forty-six failed in either one or two subjects, for which they will be allowed to reappear in conjunction with the second group of subjects.

Sir Joshua added that he thought it was a very satisfactory Report.

Science.

Report by Chemist.—In the absence through indisposition of Dr J. F. Tocher, Consulting Chemist to the Society, Major R. W. Sharpe, C.B.E., Convener of the Science Committee, submitted a Report on the work done in the Chemical Department during the first five months of 1943. The substance of the Report appears on pp. 84-87 of this volume.

Major Sharpe took the opportunity to bring before the Meeting the facilities which the Society offered for the analyses of fertilisers, feeding-stuffs, milks, waters, and poisons. In these days, when much waste lime was being offered for sale to farmers, it was important to see that it was of fairly high grade before they used a lot of transport to bring it on to the land.

Vote of Thanks.

On the motion of Mr Alexander Murdoch, East Hallside, Cambuslang, a vote of thanks was accorded to the Earl of Home for presiding. Mr Murdoch said that no one took a greater interest in the affairs of the Highland and Agricultural Society than his lordship, and he deserved their cordial thanks for presiding.

ANNIVERSARY GENERAL MEETING, 5TH JANUARY 1944.

THE EARL OF HOME, K.T., Treasurer of the Society, in the Chair.

Election of Members.

The Secretary submitted a list of forty-six candidates for election to membership. These were balloted for and duly elected.

Membership.

Major R. F. Brebner, C.B.E., The Leuchold, Dalmeny House, Edinburgh, Chairman of Directors, reported that the membership of the Society at the beginning of 1943 was 8553. During the year there had been lost, through death, resignations, and other causes, 349 members. New members elected during the year numbered 57 (20 in January and 37 in June), thus making the total membership at that date 8261.

Of that number 5756 were Life Members and 2505 paid annual subscriptions—263 on the higher and 2242 on the lower rate. 86 members of the Society had intimated that they were on service with H.M. Forces, and these, in accordance with a resolution of the Directors, would continue to receive the privileges of membership, without payment of subscriptions, throughout the duration of the war.

Vacancies on Board of Directors.

On the motion of Major R. F. Brebner, C.B.E., Chairman of Directors, Mr J. W. Alexander, M.V.O., of Newton, Golfhill, Moffat, was elected an Ordinary Director of the Society for the Dumfries Show Division, to fill the vacancy caused by the death of the late Mr William Hodge; and Mr Robert Meikle, Bearcrofts, Grangemouth, was elected an Ordinary Director for the Stirling Show Division, to fill the vacancy caused by the death of the late Mr T. Mercer Sharp.

Finance.

Mr Alexander Murdoch, East Hallside, Cambuslang, on behalf of the Treasurer, The Earl of Home, K.T., submitted the Accounts of the Society for the year ending 30th November 1943.

The Society's Capital Funds, he said, had been maintained, and showed an increase in value over the previous year.

Revenue for the year from all sources amounted to £9076, 18s. 1d., of which £1358, 6s. had been derived from annual subscriptions and £1445, 17s. from life subscriptions.

Expenditure amounted to £7763, 3s. 2d. In the year under review the net expenditure on Educational Work amounted to £93, 14s. 9d.; on work in the Chemical and Veterinary Departments, £290, 12s. 3d.; on the Society's 'Transactions,' £1222, 11s. 10d.; and in grants to Local Societies in 1942, £351, 11s. 6d.

Special Grants had been made during the year as follows: Animal Diseases Research Association, £200; Glasgow Veterinary College, £150; Royal Scottish Agricultural Benevolent Institution, £100; Scottish Agricultural Organisation Society, £100; Scottish Red Cross Agriculture Fund, £147, 19s. 7d.; other Grants, £157, 12s.—a total of £855, 11s. 7d.

Thereafter Mr Murdoch moved approval of the following Special Grants, which had been recommended by the Board of Directors:—

- (1) £100 to the Scottish Agricultural Organisation Society for the year 1944.
- (2) £100 to the Royal Scottish Agricultural Benevolent Institution for the year 1944.
- (3) £10 to the Scottish Society for the Prevention of Cruelty to Animals.

Continuing, Mr Murdoch said he would like specially to refer to the printed Abstract of Accounts. On the last page it would be found that the net income from interests and dividends amounted to £3591, and that Income Tax repaid had realised £2681. That meant that the investment income had yielded a sum of £6273. In addition there had been received by way of annual subscriptions a sum of £1358, thus producing a total of £7631. Out of that various payments had been made to the extent of £6908, to which had to be added the amount of Special Grants, £855, making a total of £7763. So far as ordinary income and expenditure were concerned, there was a deficit of £132. Life Subscriptions, however, had brought in £1445, resulting in an excess of receipts over expenditure of £1311.

Mr Murdoch went on to quote a statement, made by Lord Home at a Meeting of the Directors held that day, in connection with the Society's administrative expenses. He said that the Highland Society ought to get credit in its Accounts for that part of the expenditure which had been incurred in connection with the administration of the Scottish Red Cross Agriculture Fund. It was only fair, he thought, that that position should be made clear to the members of the Society.

Mr George Grant of Glonfarclas seconded, and the Accounts were then adopted and the Special Grants unanimously approved.

Argyll Naval Fund.

Mr James R. Lumsden of Arden, Convener of the Committee of the Argyll Naval Fund, submitted the report on the Fund for the year ended 30th November 1943. The income from the Fund for the year amounted to £343, 15s. 4d., while the expenditure comprised grants of £40 each to four, and grants of £20 each to three, Naval Cadets—a total of £220.

Scottish Red Cross Agriculture Fund.

The Secretary reported that at the end of its third year of activities, on 16th April 1943, the Fund had reached a total of £377,665, 4s. 7d. Since that date a further sum of £27,031, 14s. had been received, comprising:—

Free Gift Sales, Levies, and Collections by Area Committees	£11,374 14 8
Victory Garden Shows and Sales	6,868 8 9
Farm Workers' Penny-a-Week Contributions	194 11 7
Other Contributions	8,593 19 0

£27,031 14 0

Adding that amount to the total at 16th April 1943 gave a grand total of £404,696, 18s. 7d. contributed by Scottish Agriculturists to the benevolent work of the Red Cross during the past 3½ years.

While it was satisfactory to know that the Fund had now passed the £400,000 mark, it was regretted that the amount received during the past eight months had been considerably less than the amount received during the corresponding period of the previous year. That was mainly due to the fact that, in the previous year, certain centres, such as Castle-Douglas, Dingwall, and Tain, had held most successful Sales, the proceeds of which had come into account during the corresponding period. Those centres, unfortunately, or at least some of them, found it impossible to organise a Sale every year, so that their contributions come in only in alternate years.

The Committee was anxious, therefore, that other sources of income should be opened up in order to fill the gap caused by the absence of these fine contributions, and, in this connection, it was encouraging to report that the Ayrshire Cattle Herd Book Society had generously organised sales of Pedigree Ayrshire Cattle on behalf of the Fund. These sales so far had been extremely well supported by Ayrshire breeders, and there accordingly appeared to be every reason to expect that a substantial contribution to the Fund would be secured. The splendid example set by the Ayrshire Cattle Society would, it was hoped, be followed by other Cattle Breed Societies in Scotland.

Very few returns had yet been received from the Area Committees, but it was known that many of them were actively renewing their efforts, the proceeds of which would be received before the end of the financial year. Mention, however, was made of a handsome sum of £3155 which had been received from the Mid and East Berwick Area Committee. Other notable contributions were from Stonehaven, £2232; Cluny and Monymusk, £1086; and a first contribution of £1000 from St Boswells Centre Committee.

Victory Garden Shows and Sales.—Victory Garden Shows and Sales had been carried on with great enthusiasm during the Season 1943 by Horticultural Societies and Allotment Associations. The amount received from that source up to date was £6868, and the proceeds of one or two Shows had yet to come to hand. That compared with a total of £3889 in the Season 1942.

In view of the splendid results achieved by these Horticultural and Allotment Societies, the Secretary mentioned a few of the outstanding results: Leven, Fife, headed the list with a total of £400; next in order was Carmyle, Glasgow, £365; Ballantrae, Ayrshire, £350; Lengerofft, Bonnybridge, £311; Oban, £304; the Royal Caledonian Horticultural Society, £300; and Dalmenington, Ayrshire, £300. A full report on these Garden Shows would be issued shortly, giving complete details of the sums received. From this it would be seen that, in many cases, the amounts raised had been doubled as compared with the preceding year, and, in some cases, trebled.

Other Contributions.—A handsome contribution of £3889 had been received from the Scottish Council of the National Association of Corn and Agricultural Merchants.

That sum has been subscribed by members of the Association, and, in addition, Covenants had been signed for a further sum of £1805, thus bringing the Association's contribution to a total of £5494.

A member of the Highland Board, Mr George Grant of Glenfarclas, had given a notable donation of £1000, being the largest donation received by the Fund from any one individual.

While the Fund had done marvellously in the past, and continued to receive splendid support from the agricultural community, the Committee were anxious lest there should be any falling off during that, the fourth, year. They regarded it as most desirable that, by the 16th of April next, the Fund should reach the half-million mark, so as to keep pace with the great progress made by the corresponding Fund in England. For that reason, it was urged that the Directors of the Society, and all its members, should do everything in their power to further the progress of the Fund in their own particular areas during the coming three months.

The Chairman, Lord Home, added that it was a very interesting and satisfactory Report. He hoped their fellow-countrymen and women would rally in support of the Fund so that they would reach the half-million mark before 16th April next. He would like also to thank Mr Stirton and his staff for the steady work they did on behalf of the Fund.

Grants to Local Societies.

Mr Peter Gordon, Balcraig Moor, Portwilliam, reported that three years ago the Directors decided that all grants by the Society of money or medals in aid of Local Agricultural Shows be suspended for the duration of the war. In consequence of that decision, therefore, the grants made by the Society for 1943 were largely restricted to Horse-Breeding Associations in Scotland, and a total sum of £165 was expended during the year in respect of such grants. Special grants to Federations of Scottish Women's Rural Institutes and for Allotment Competitions amounted to £52, 12s. 2d., and the cost of Ploughing, Hoeing, and Long Service Awards was £58, 19s. 4d.—making a total expenditure of £286, 11s. 6d. for the year 1943.

The issue of Gold Medals for Long Service had also been temporarily suspended during the war, but applicants would be entitled in the meantime to the appropriate Certificate, and would be eligible to receive the Gold Medals when these became available.

For the year 1944 the Directors had confirmed the following grants: nine Horse-Breeding Associations for grants of £15 each in respect of Stallions engaged; £15 and fifteen Silver Medals to the Scottish National Union of Allotment Holders for Allotments Competitions; various special grants to Federations of Scottish Women's Rural Institutes; and the usual awards for Long Service, &c.—the total estimated expenditure in 1944 for all grants being £318.

National Diploma in Dairying.

Sir Joshua Ross-Taylor submitted the following Report on the Examination held in September 1943:—

The Forty-eighth Annual Examination for the National Diploma in Dairying took place during September at the Dairy School for Scotland, Auchincruive, Ayr, for Scottish students, and at the University and British Dairy Institute, Reading, for English and Welsh students.

At the Auchincruive Centre 45 candidates presented themselves—38 candidates appeared for all subjects, and 7 for re-examination in certain subjects in which they had previously failed. 30 candidates obtained the Diploma.

At the Reading Centre 62 candidates presented themselves—52 taking the whole Examination, and 10 for re-examination in certain subjects in which they had failed to pass previously. 37 candidates obtained the Diploma.

The names of the successful candidates appear in the Appendix to this volume.

Of those candidates who failed, 8 at Auchincruive and 17 at Reading failed in not more than three subjects, and these would be permitted, after further study, to reappear for the subjects in which they failed at the next Examination.

Sir Joshua remarked that the percentage pass both at Auchincruive and at Reading was a very good one.

General.

Major R. F. Brebner, C.B.E., Chairman of Directors, reported shortly on various other matters which had engaged the attention of the Board of Directors during the past year.

Post-war Agriculture.—Major Brebner said that the Special Committee on Post-war Agriculture had completed its deliberations during the summer, and its Report, in the

form of a Memorandum, had then been submitted to the Board of Directors on 3rd November 1943. He pointed out that the Memorandum did not go into minute detail, but set forth in the shortest possible terms what was considered necessary to secure a stable Agriculture.

The Memorandum had been approved by the Directors, and copies were thereafter sent to the Secretary of State for Scotland, the Department of Agriculture for Scotland, and to Scottish Members of Parliament.

The Memorandum appears in full on pp. 88-95 of this volume.

Farm Buildings.—The Directors had appointed a Committee of their number to prepare evidence to be submitted on behalf of the Society to the Committee appointed by the Secretary of State for Scotland to consider and make recommendations regarding the layout, design, and construction of farm buildings after the war.

New Implements.—Major Brebner went on to say that the Directors had remitted to the Implements Committee to consider the holding of Demonstrations of the latest implements—one in the early summer and the other in the autumn of 1944.

Hill Sheep Subsidy.—Major Brebner intimated that he had represented the Society at a Conference convened by the N.F.U. and Chamber of Agriculture regarding the question of the payment of a Hill Sheep Subsidy for 1943, and had collaborated with that body and other bodies interested in representations on the subject made to the Department of Agriculture for Scotland.

Science.

Report by Chemist.—Dr J. F. Tocher, Consulting Chemist to the Society, submitted a brief summary of the results of analyses made by him, and commented on the results, for 1943. The substance of the report appears on pp. 84-87 of this volume.

Vote of Thanks.

On the motion of Mr James Wyllie, Dumfries, a vote of thanks was accorded to the Earl of Home for presiding.

APPENDIX

PREMIUM BOOK

OF

THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND

1944

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Address for communications:

JOHN STIRTON, Secretary,
The Highland and Agricultural Society of Scotland,
8 Eglinton Crescent,
Edinburgh 12.

GENERAL NOTICE.

THE HIGHLAND SOCIETY was instituted in the year 1784, and incorporated by Royal Charter in 1787. Its operation was at first limited to matters connected with the improvement of the Highlands of Scotland; but the supervision of certain departments, proper to that part of the country, having been subsequently committed to special Boards of Management, several of the earlier objects contemplated by the Society were abandoned, while the progress of agriculture led to the adoption of others of a more general character. The exertions of the Society were thus early extended to the whole of Scotland, and have since been continuously directed to the promotion of the science and practice of agriculture in all its branches.

In accordance with this more enlarged sphere of action, the original title of the Society was altered, under a Royal Charter, in 1834, to THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND.

The Society avoids questions of political controversy, but in other public matters of practical concern to agriculture it seeks to guard and promote, by every means in its power, the welfare of all interested in the agriculture of Scotland.

Among the more important measures which have been effected by the Society

1. Agricultural Meetings and General Shows of Stock, Implements, &c., held in the principal towns of Scotland, at which exhibitors from all parts of Great Britain, Northern Ireland, and Eire (Irish Free State) are allowed to compete.

2. A system of District Shows instituted for the purpose of improving the breeds of Stock most suitable for different parts of the country, and of aiding and directing the efforts of Local Agricultural Societies and Associations.

3. A scheme of Awards to Farm Workers for long and approved service in Scotland.

4. The encouragement of Agricultural Education, under powers conferred by a supplementary Royal Charter, granted in 1856, and authorising the Society to grant Diplomas to Students of Agriculture; and by giving grants in aid of education in Agriculture and allied sciences. In 1900 the Society discontinued its own Examination, and instituted jointly with the Royal Agricultural Society of England an Examination for a National Diploma in Agriculture.

5. The institution of an Examination for a National Diploma in Dairying, jointly with the Royal Agricultural Society of England and the British Dairy Farmers' Association.

6. The institution of an Examination in Forestry for First and Second Class Certificates. Terminated in 1935 in accordance with arrangements made with the Royal Scottish Forestry Society.

7. The advancement of the Veterinary Art, by conferring Certificates on Students who have passed through a prescribed curriculum, and who are found, by public examination, qualified to practise. Terminated in 1881 in accordance with arrangements made with the Royal College of Veterinary Surgeons.

8. The appointment of a Chemist for the purpose of promoting the application of science to agriculture.

9. The establishment of a Botanical Department.

10. The appointment of an Entomologist to advise members regarding insect pests, &c.

11. The annual publication of the 'Transactions,' comprehending papers by selected writers, Prize Reports, and reports of experiments, also an abstract of the business at Board and General Meetings, and other communications.

12. The management of a fund left by John, 5th Duke of Argyll (the original President of the Society), to assist young natives of the Highlands who enter His Majesty's Navy.

CONSTITUTION AND MANAGEMENT.

The general business of THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND is conducted under the sanction and control of the Royal Charters, referred to above, which authorise the enactment of Bye-Laws.

The Office-Bearers consist of a President, Four Vice-Presidents, Thirty-two Ordinary and Twenty Extraordinary Directors, a Treasurer, an Honorary and an Acting Secretary, an Auditor, and other Officers.

The Supplementary Charter of 1856 provides for the appointment of a Council on Education, consisting of Sixteen Members—Nine nominated by the Charter and Seven elected by the Society.

STATEMENT OF PRIVILEGES OF MEMBERS.

MEMBERS OF THE SOCIETY ARE ENTITLED—

1. *To receive a free copy of the 'Transactions' annually.*
2. *To apply for District Premiums that may be offered, and for Long Service Awards for Agricultural Employees.*
3. *To report Ploughing Matches for Medals that may be offered.*
4. *To Free Admission to the Shows of the Society.*
5. *To exhibit Live Stock and Implements at reduced rates.*

Firms are not admitted as Members; but if one partner of a firm becomes a Member the firm is allowed to exhibit at Members' rates.

6. *To have Fertilisers and Feeding-Stuffs, &c., analysed at reduced fees.*
7. *To obtain Reports on the Animal Enemies of Crop Plants and Live Stock (including Poultry).*
8. *To attend and vote at General Meetings of the Society.*
9. *To vote for the Election of Directors.*
&c., &c.

ANALYSES OF FERTILISERS AND FEEDING-STUFFS, &c.

The scale of Fees in respect of Analyses made by the Society's Chemist for Members of the Society will be found under "Chemical Department."

Valuations of manures, according to the Society's scale of units, will be supplied on application being made.

For further particulars, see under Chemical Department.

Chemist.—Mr J. F. TOCHER, D.Sc., LL.D., F.I.C., Crown Mansions, 41½ Union Street, Aberdeen.

REPORTS ON THE ANIMAL ENEMIES OF CROP PLANTS AND LIVE STOCK (INCLUDING POULTRY).

The Consulting Zoologist is prepared to send to any Member of the Society a Report on damage to, or diseases of, plants and animals due to animal agency (Insects, Mites, Worms, Snails, Slugs, Birds, and the Smaller Mammals).

For further particulars, see under Entomological Department.

Consulting Zoologist.—Mr A. E. CAMERON, M.A., D.Sc., Department of Agricultural and Forest Zoology, University of Edinburgh, 10 George Square, Edinburgh.

TERMS OF MEMBERSHIP, &c.

The influence and usefulness of the Society depend mainly upon its strength in membership. The Members, through the Directors whom they elect, have the practical control of the affairs of the Society. The stronger the body of Members, the greater will be the usefulness of the Society. It will therefore be to both their own and the public advantage if all who are interested in agriculture, and who are not already enrolled, should at once become Members of the Society.

ELECTION OF MEMBERS.

Candidates for admission to the Society must be proposed by a Member, and are elected at the half-yearly General Meetings in January and June. It is not necessary that the proposer should attend the Meeting.

RATES OF SUBSCRIPTION.

HIGHER SUBSCRIPTION.

The ordinary annual subscription is £1, 3s. 6d., and the ordinary subscription for life-membership is £12, 12s.; or after ten annual payments have been made, £7, 7s.

LOWER SUBSCRIPTION.

Proprietors farming the whole of their own lands, whose rental on the Valuation Roll does not exceed £500 per annum, and all Tenant-Farmers, Secretaries or Treasurers of Local Agricultural Associations, Factors resident on Estates, Land Stewards, Foresters, Agricultural Implement Makers, Grain, Seed and Manure Merchants, Agricultural Auctioneers, Cattle Dealers and Veterinary Surgeons, none of them being also owners of land to an extent exceeding £500 per annum, and such other persons as, in respect of their official or other connection with agriculture, the Board of Directors may consider eligible, are admitted on a subscription of 10s. annually, which may be redeemed by one payment of £7, 7s., and after eight annual payments of 10s. have been made, a Life Subscription may be purchased for £5, 5s., and after twelve such payments, for £3, 3s.

It must be stated, on behalf of Candidates claiming to be admitted at the Lower Rate of Subscription (10s.), under which of the above designations they are entitled to be admitted at the Lower Rate.

Subscriptions are payable on election, and afterwards annually in January.

According to the Charter, a Member who shall not have objected to his election, on the same being intimated to him by the Secretary, cannot retire until he has paid, in annual subscriptions or otherwise, an amount equivalent to a life composition.

Members are requested to send to the Secretary the names and addresses of Candidates proposed for admission to the Society, at the same time stating whether the Candidates should be admitted at the £1, 3s. 6d. or 10s. rate.

ron of the Society.—HIS MAJESTY THE KING.

OFFICERS AND DIRECTORS FOR 1943-1944.

President.

Sir DONALD W. CAMERON OF LOCHIEL, K.T., Achnacarry, Spean Bridge, Inverness-shire.

Vice-Presidents.

THE DUKE OF SUTHERLAND, K.T., P.C., Dunrobin Castle, Golspie.
THE EARL OF LEVEN AND MELVILLE, K.T., Glenferness House, Nairn.

Year of
Election.

Ordinary Directors.

- | | |
|------|--|
| | (MATTHEW TEMPLETON, Goshen Bank, Kelso (<i>elected 3rd June 1942</i>).
JAMES R. LUMSDEN of Arden, Dumbartonshire.
J. FAED SPROAT, Boreland of Anwoth, Gatehouse, Castle Douglas. |
| 1940 | (Major R. F. BREBNER, C.B.E., The Leuchold, Dalmeny House, Edinburgh.
Major A. D. CAMPBELL, Stanstill, Wick.
JAMES PATON, Kirkness, Glencraig.
ALEXANDER MURDOCH, East Hallside, Cambuslang, Lanarkshire.
G. H. RUSSELL of The Burn, Glenesk, Brechin.
(ROBERT W. MEIKLE, Bearcrofts, Grangemouth (<i>elected 5th January 1944</i>).
JAMES WYLLIE, Beaumont, Victoria Road, Dumfries.
JOHN KERR, Yorkston, Gorebridge, Midlothian.
RALPH S. MACWILLIAM, Garguston, Muir of Ord, Ross-shire |
| 1941 | ((<i>elected 3rd June 1942</i>).
A. W. HOWISON, Rannagulzion, Blairgowrie.
A. A. HAGART SPEIRS of Elderslie, Houston House, Renfrewshire.
JOHN P. SLEIGH of St John's Wells, Fyvie.
Captain R. J. THOMSON, Kaimies, West Linton (<i>elected 7th June 1944</i>).
J. W. ALEXANDER, M.V.O., of Newton, Gohull, Moffat (<i>elected 5th January 1944</i>).
W. J. CAMPBELL, 61 Fountainhall Road, Edinburgh.
FRANCIS W. WALKER of Leys, Leys Castle, Inverness. |
| 1942 | (WILLIAM H. LAWSON, Frithfield, Anstruther.
WILLIAM BROWN, Craigton, Bishopston, Renfrewshire.
JOHN N. REID, Cromley Bank, Ellon.
Sir JOSHUA ROSS-TAYLOR, Mungoswalls, Duns.
J. E. KERR of Harviestoun, Dollar.
WILLIAM D. SIMPSON, Highfield, North Berwick.
IAN M. CAMPBELL, Bal Blair, Invershin, Sutherland.
THE EARL OF ELGIN AND KINCARDINE, K.T., C.M.G., Broomhall, Dunfermline. |
| 1943 | (A. W. MONTGOMERIE, Westburn Farm, Cambuslang, Lanarkshire.
ALEXANDER FORBES, Rettie, Banff.
R. SCOTT AITON, M.C., Legerwood, Earlston.
Captain JAMES CRAIG, Innergeldie, Comrie.
(JAMES WITHER, Awhirk, Stranraer. |

Year of
Election.

Extraordinary Directors.

- | | |
|------|---|
| 1942 | { DAVID BLAIR, Littleinch, Wormit, Fife.
JAMES DURNO, Crichtie, Inverurie.
ALEXANDER CLARK, Strathore House, Thornton, Fife.
PETER GORDON, Balcraig Moor, Port William.
GEORGE GRANT of Glenfarclas, Blacksboat.
THOMAS HUTCHISON (Barclay, Ross & Hutchison, Ltd.), 67-71
Green, Aberdeen. |
| 1943 | { JAMES KILPATRICK, Craigie Mains, Kilmarnock.
FINLAY MACGILLIVRAY, Greenhead, Pencaitland, East Lothian.
Captain IAN S. ROBERTSON, Linkwood, Elgin. |

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 Edinburgh, *Consulting Zoologist*.
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Major R. F. BREBNER, C.B.E., The Leuchold, Dalmeny House, Edinburgh.

Chairmen of Committees.

- | | |
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| 1. <i>Argyll Naval Fund</i> | JAMES R. LUMSDEN of Arden, Dum-
bartonshire. |
| 2. <i>Finance, Chambers, and Law</i> | The EARL OF HOME, K.T., The Hirsell,
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| 4. <i>Shows</i> | IAN M. CAMPBELL, Bal Blair, Invershin. |
| 5. <i>Implements and Machinery</i> | Sir JOSHUA ROSS-TAYLOR, Mungos-
walls, Duns. |
| 6. <i>Science</i> | |
| 7. <i>General Purposes</i> | Major R. F. BREBNER, C.B.E., The Leuc-
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 MATTHEW TEMPLETON, Goshen Bank, Kelso.
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JAMES WITHER, Awhirk, Stranraer.

JAMES WYLLIE, Beaumont, Victoria Road, Dumfries.

Major R. F. BREBNER, C.B.E., The Leuchold, Dalmeny House, Edinburgh,
Chairman of Board of Directors, *ex officio*.

The EARL OF HOME, K.T., The Hirsell, Coldstream, Treasurer, *ex officio*.

Colonel F. J. CARRUTHERS, C.B., of Dormont, Lockerbie, Honorary
Secretary, *ex officio*.

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ALEXANDER CLARK, Strathore House, Thornton, Fife.

Captain JAMES CRAIG, Innergeldie, Comrie.

JAMES DURNO, Crichtie, Inverurie.

The EARL OF ELGIN AND KINCARDINE, K.T., C.M.G., Broomhall, Dunfermline.

GEORGE GRANT of Glenfarclas, Blacksboat.

A. W. HOWISON, Rannagulzion, Blairgowrie.

J. E. KERR of Harviestoun, Dollar.

JAMES KILPATRICK, Craigie Mains, Kilmarnock.

JAMES R. LUMSDEN of Arden, Dumbartonshire.

FINLAY MACGILLIVRAY, Greenhead, Pencaitland, East Lothian.
 RALPH S. MACWILLIAM, Garguston, Muir of Ord, Ross-shire.
 A. W. MONTGOMERIE, Westburn Farm, Cambuslang, Lanarkshire.
 ALEXANDER MURDOCH, East Hallside, Cambuslang, Lanarkshire.
 JAMES PATON, Kirkness, Glencraig.
 Sir JOSHUA ROSS-TAYLOR, Mungoswalls, Duns.
 WILLIAM D. SIMPSON, Highfield, North Berwick.
 A. A. HAGART SPEIRS of Elderslie, Houston House, Renfrewshire.
 J. FAED SPROAT, Boreland of Anwoth, Gatehouse, Castle Douglas.
 MATTHEW TEMPLETON, Goshen Bank, Kelso.
 FRANCIS W. WALKER of Leys, Leys Castle, Inverness.
 JAMES WITHER, Awhirk, Stranraer.
 JAMES WYLLIE, Beaumont, Victoria Road, Dumfries.
 The EARL OF HOME, K.T., The Hirsell, Coldstream, Treasurer, *ex officio*.
 Colonel F. J. CARRUTHERS, C.B., of Dormont, Lockerbie, Honorary Secretary, *ex officio*.
 J. F. TOCHER, D.Sc., LL.D., F.I.C., 41½ Union Street, Aberdeen, Chemist, *ex officio*.
 A. E. CAMERON, M.A., D.Sc., University of Edinburgh, 10 George Square, Edinburgh, Consulting Zoologist, *ex officio*.

7. GENERAL PURPOSES.

Major R. F. BREBNER, C.B.E., The Leuchold, Dalmeny House, Edinburgh,
 Chairman of Board of Directors, *Convener*.
 R. SCOTT AITON, M.C., Legerwood, Earlston.
 J. W. ALEXANDER, M.V.O., of Newton, Golfhill, Moffat.
 DAVID BLAIR, Littleinch, Wormit, Fife.
 W. J. CAMPBELL, 61 Fountainhall Road, Edinburgh.
 ALEXANDER CLARK, Strathore House, Thornton, Fife.
 JAMES DURNO, Crichtie, Inverurie.
 The EARL OF ELGIN AND KINCARDINE, K.T., C.M.G., Broomhall, Dunfermline.
 J. E. KERR of Harviestoun, Dollar.
 ALEXANDER MURDOCH, East Hallside, Cambuslang, Lanarkshire.
 JAMES PATON, Kirkness, Glencraig.
 Sir JOSHUA ROSS-TAYLOR, Mungoswalls, Duns.
 WILLIAM D. SIMPSON, Highfield, North Berwick.
 MATTHEW TEMPLETON, Goshen Bank, Kelso.
 The EARL OF HOME, K.T., The Hirsell, Coldstream, Treasurer, *ex officio*.
 Colonel F. J. CARRUTHERS, C.B., of Dormont, Lockerbie, Honorary Secretary, *ex officio*.
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8. EDUCATION.

Colonel F. J. CARRUTHERS, C.B., of Dormont, Lockerbie, Honorary Secretary, *Convener*.
 Major R. F. BREBNER, C.B.E., The Leuchold, Dalmeny House, Edinburgh,
 Chairman of Board of Directors.
 ALEXANDER MURDOCH, East Hallside, Cambuslang, Lanarkshire.
 JAMES PATON, Kirkness, Glencraig.
 Sir JOSHUA ROSS-TAYLOR, Mungoswalls, Duns.
 JOHN STIRTON, 8 Eglinton Crescent, Edinburgh.

9. OFFICE-BEARERS.

Constitution : (1) The four Ordinary Directors for the Division in which the Show for the year is to be held (with the exception of one retiring next year) ; (2) one Ordinary Director from each of the other Show Divisions ; and (3) the Chairman of the Board, Treasurer, and Hon. Secretary, *ex officio*.

Perth . A. W. HOWISON, Rannagulzion, Blairgowrie.
Glasgow . WILLIAM BROWN, Craigton, Bishopton, Renfrewshire.
Aberdeen . JOHN P. SLEIGH of St John's Wells, Fyvie.
Borders . Sir JOSHUA ROSS-TAYLOR, Mungoswalls, Duns.
Stirling . J. E. KERR of Harviestoun, Dollar.
Dumfries . JAMES WYLLIE, Beaumont, Victoria Road, Dumfries.
Edinburgh . W. J. CAMPBELL, 61 Fountainhall Road, Edinburgh.
Inverness . IAN M. CAMPBELL, Bal Blair, Invershin, Sutherland.

Major R. F. BREBNER, C.B.E., The Leuchold, Dalmeny House, Edinburgh, Chairman of Board of Directors, *ex officio*.
 The EARL OF HOME, K.T., The Hirsell, Coldstream, Treasurer, *ex officio*.
 Colonel F. J. CARRUTHERS, C.B., of Dormont, Lockerbie, Honorary Secretary, *ex officio*

REPRESENTATIVES ON OTHER BODIES.

National Agricultural Examination Board and National Dairy Examination Board.

Colonel F. J. CARRUTHERS, C.B., of Dormont, Lockerbie.
 Major R. F. BREBNER, C.B.E., The Leuchold, Dalmeny House, Edinburgh.
 ALEXANDER MURDOCH, East Hallside, Cambuslang, Lanarkshire.
 JAMES PATON, Kirkness, Glencraig.
 Sir JOSHUA ROSS-TAYLOR, Mungoswalls, Duns.
 JOHN STIRTON, 8 Eglinton Crescent, Edinburgh.

Edinburgh and East of Scotland College of Agriculture.
 JOHN STIRTON, 8 Eglinton Crescent, Edinburgh.

West of Scotland Agricultural College.
 JAMES R. LUMSDEN of Airden, Dumbartonshire.

Aberdeen and North of Scotland College of Agriculture.
 J. F. TOCHER, D.Sc., LL.D., F.I.C., 41½ Union Street, Aberdeen.

Royal (Dick) Veterinary College.

Major R. F. BREBNER, C.B.E., The Leuchold, Dalmeny House, Edinburgh

Glasgow Veterinary College.

ALEXANDER MURDOCH, East Hallside, Cambuslang, Lanarkshire.

Animal Diseases Research Association.

Major R. F. BREBNER, C.B.E., The Leuchold, Dalmeny House, Edinburgh.

Scottish Milk Records Association.

JAMES KILPATRICK, Craigie Mains, Kilmarnock.

Captain IAN S. ROBERTSON, Linkwood, Elgin.

JAMES WITHER, Awhirk, Stranraer.

National Trust for Scotland.

Sir JOSHUA ROSS-TAYLOR, Mungoswalls, Duns.

Royal Scottish Agricultural Benevolent Institution.

Major R. F. BREBNER, C.B.E., The Leuchold, Dalmeny House, Edinburgh.

Association for the Preservation of Rural Scotland.

The EARL OF ELGIN AND KINCARDINE, K.F., C.M.G., Broomhall, Dunfermline.

Scottish Country Industries Development Trust.

The EARL OF ELGIN AND KINCARDINE, K.T., C.M.G., Broomhall, Dunfermline.

Scottish National Association of Young Farmers' Clubs.

JAMES PATON, Kirkness, Glencairg.

SCOTTISH PLANT REGISTRATION STATION.**Standing Committee of Management.**

Major R. F. BREBNER, C.B.E., The Leuchold,	} <i>Appointed for 5 years from 1st January 1941.</i>
Dalmeny House, Edinburgh.	
JAMES HOPE, Eastbarns, Dunbar.	
JAMES WITHER, Awhirk, Stranraer.	

MEETINGS.

General Meetings.—By the Charter the Society must hold two General Meetings each year, and, under ordinary circumstances, they are held in the months of January and June, for the election of Members and other business. Twenty a quorum.

By a resolution of the General Meeting held on 15th January 1879, a General Meeting of Members is held in the Showyard on the occasion of the Annual Show.

With reference to motions at General Meetings, Byo-Law No. 19 provides that “At General Meetings of the Society no motion or proposal (except of mere form or courtesy) shall be submitted or entertained for immediate decision unless notice thereof has been given two weeks previously to the Board of Directors, without prejudice, however, to the competency of a motion or proposal, of which due notice has not been given, being remitted to the Directors for consideration, and thereafter being disposed of at a future General Meeting.”

Directors' Meetings.—The Board of Directors meet (except when otherwise arranged) on the first Wednesday of each month from November to June, inclusive, at 1.30 P.M., and occasionally as business may require, on a requisition by three Directors to the Secretary, or on intimation by him. Seven a quorum.

Committee Meetings.—Meetings of the various Committees are held as required.

Nomination of Directors.—Meetings of Members, for the purpose of nominating Directors to represent the Show Divisions on the Board for the year 1945-1946, will be held at the places and on the days after-mentioned :-

DIVISION.		
1. <i>Edinburgh.</i>	Market Buildings, Gorgie, Edinburgh	Wed., 24th Jan. 1945, at 1.
2. <i>Glasgow.</i>	Central Station Hotel, Glasgow	Wed., 7th Feb. 1945, at 1
3. <i>Stirling.</i>	Golden Lion Hotel, Stirling	Thur., 8th Feb. 1945, at 1.30.
4. <i>Perth.</i>	Salutation Hotel, Perth	Fri., 9th Feb. 1945, at 2
(The Meeting will be held in 1946 at Cupar)		
5. <i>Borders.</i>	County Buildings, St Boswells	Thur., 15th Feb. 1945, at 3.
6. <i>Inverness.</i>	Station Hotel, Inverness	Tues., 20th Feb. 1945, at 2
7. <i>Aberdeen.</i>	Imperial Hotel, Aberdeen	Fri., 23rd Feb. 1945, at 2.30.
8. <i>Dumfries.</i>	King's Arms Hotel, Dumfries	Wed. 7th March 1945, at 2.30.

The nomination of a Proprietor or other Member paying the higher subscription must be made in the 1st, 2nd, 4th and 5th Divisions; and the nomination of a Tenant-Farmer or other Member paying the lower subscription in the 3rd, 6th, 7th and 8th Divisions.

A Member who has served as an Ordinary Director for a term of four years is not eligible to be nominated again till after the lapse of at least one year. An Extraordinary Director may, however, be nominated as an Ordinary Director.

GENERAL SHOW.

Owing to the outbreak of War, the Board of Directors decided to cancel all Shows for the duration of the War.

EXAMINATIONS.

Agriculture.—In order to assist candidates at the English and Welsh Colleges, the Examination in 1944 for the National Diploma in Agriculture will be held (1) in the Chambers of the Highland and Agricultural Society of Scotland on Wednesday, 6th April, and following days. Applications close on Monday, 21st February; (2) at the University of Leeds on Wednesday, 12th July, and following days. Applications close on Saturday, 20th May.

Dairying.—The Examination in 1944 (Scottish Centre) for the National Diploma in Dairying will be held at the Dairy School for Scotland, Auchincruive, Ayr. *Written*—On Wednesday, Thursday, and Friday, 6th, 7th, and 8th September. *Oral and Practical*—On Monday, 18th September, and following days. Applications close on Monday, 31st July.

Forestry.—The Final Examination for the Society's First and Second-Class Certificates in Forestry was held in 1935.

In view of the institution of Examinations for Certificates and Diplomas in Forestry by the Royal Scottish Forestry Society, and by arrangement with that Society, the Board of Directors of the Highland and Agricultural Society of Scotland resolved in 1935 to cease holding further Examinations for the First and Second-Class Certificates, and that, in future, the granting of Certificates and Diplomas be left in the hands of the Royal Scottish Forestry Society.

All communications in connection with Examinations in Forestry should now be addressed to the Secretary, Royal Scottish Forestry Society, 8 Rutland Square, Edinburgh 1.

NATIONAL DIPLOMA IN AGRICULTURE

By a Supplementary Charter under the Great Seal, granted in 1856, the Society is empowered to grant Diplomas.

From 1858 to 1899 the Society held an annual Examination for Certificate and Diploma in Agriculture. In 1873 the Free Life Membership of the Society was granted to winners of the Diploma. In 1882 permission was given to holders of the Diploma to append the letters F.H.A.S. to their names. These arrangements terminated in 1899.

In 1898 it was resolved by the Royal Agricultural Society of England and the Highland and Agricultural Society of Scotland to discontinue the independent Examinations in Agriculture held by the two Societies, and to institute in their stead a Joint-Examination for a NATIONAL DIPLOMA IN AGRICULTURE (N.D.A.). This Examination is now conducted under the management of "The National Agricultural Examination Board" appointed by the two Societies. The first Joint Examination was held in 1900.

REGULATIONS FOR EXAMINATION IN THE SCIENCE AND PRACTICE OF AGRICULTURE

EXAMINATIONS IN 1944.

1. The Societies may hold conjointly, under the management of the National Agricultural Examination Board appointed by them, an Annual Examination in the Science and Practice of Agriculture, at a convenient centre.

2. Candidates who pass the Examination will receive the National Diploma in Agriculture—the Diploma to be distinguished shortly by the letters "N.D.A."

3. The Examination will be conducted by means of written papers and oral examinations.

4. In order to be eligible to sit for the Board's Examination in Agriculture, a candidate must—

(a) Present a certificate from a recognised Agricultural College that his attainments in the subjects of *General Botany, Geology, General Chemistry, Physics, and Mechanics*, as attested by class and other examinations, are, in the opinion of the authorities of the College, such as to justify his admission to the Board's Examination; or

(b) Produce evidence that he has passed the 1st B.Sc. or the Intermediate Examination in Science of a British University; or

(c) Present a School Certificate awarded by a British University Examination Board, and produce evidence that he has continued his study of science for at least a year and has obtained a certificate in Physics, Chemistry and Botany at the Higher Certificate Examination of a British University Examination Board; or

(d) Present a Leaving Certificate in Science (including Chemistry and Botany) of the Scottish Education Department.

5. In the case of students who satisfy the Board that they have not had the facilities for obtaining the foregoing certificates, the Board will be prepared to consider evidence of equivalent attainment. [Applications under this rule must be lodged *three months* before the date of the annual examination.]

6. *Before sitting for the PRACTICAL AGRICULTURE and FARM MACHINERY AND IMPLEMENTS papers, all candidates must produce evidence of possessing a practical knowledge of Agriculture obtained by residence on a farm in the British Isles for a period or periods (not more than two) covering a complete year of farming operations.*

7. Candidates will have the option of taking the whole of the following nine papers at one time, or of sitting for a group of *any three, four, or five* in the first year and the remaining subjects (at one examination) within the next two years :—

SUBJECT.	Maximum Marks.	Pass Marks.
1. Practical Agriculture (First Paper)	400	240
2. Practical Agriculture (Second Paper)	400	240
3. Farm Machinery and Implements	300	150
4. Land Surveying and Farm Buildings	100	50
5. Agricultural Chemistry . . .	200	100
6. Agricultural Botany . . .	200	100
7. Agricultural Book-keeping . .	200	100
8. Agricultural Zoology . . .	100	50
9. Veterinary Science and Hygiene .	200	100
	2100	1130

NOTE.—Candidates taking the Examination in two groups of subjects are recommended to take Agricultural Chemistry and Agricultural Botany in the first group.

8. A candidate who obtains not less than three-fourths (1575) of the aggregate maximum marks (2100) in the entire Examination will receive the Diploma with Honours, provided that he obtains not less than three-fourths (600) of the maximum marks (800) in the two Practical Agriculture papers.

9. Candidates electing to take the entire Examination at one time and failing in not more than three subjects may appear for these subjects in the following year. Failure in more than three subjects will be regarded as failure in the whole Examination.

10. In the case of candidates electing to take the Examination in two groups—

(a) A candidate appearing for a group of *three* subjects and failing in a single subject may, *in the case of a first group*, appear for that subject along with the second group, or, *in the case of a second group*, in the following year. Failure in more than one subject will be regarded as failure in the group.

(b) A candidate appearing for a group of *four* or more subjects and failing in not more than two subjects may, *in the case of a first group*, appear for these subjects along with the second group, or, *in the case of a second group*, in the following year. Failure in more than two subjects will be regarded as failure in the group.

11. Non-returnable fees must be paid by candidates as follows :—

Entire Examination	Six guineas.
Group of subjects	Three guineas.
Reappearance for any subjects	10/6 per subject.

12. The Board reserve the right to postpone, abandon, or in any way, or at any time, modify an Examination, and also to decline at any stage to admit any particular candidate to the Examination.

EXAMINATIONS IN 1944.

In order to assist candidates at the English and Welsh Colleges, the Board have decided to hold two Examinations in 1944.

Candidates will be permitted to appear at EITHER of these, but not at both.

The Examinations will be held as under : -

SCOTLAND.—At Edinburgh in the Chambers of the Highland and Agricultural Society of Scotland, 8 Eglinton Crescent, on WEDNESDAY, 5th APRIL 1944, and following days. Last date for receiving Applications, MONDAY, 21st FEBRUARY 1944.

ENGLAND. At the University of Leeds, on WEDNESDAY, 12th JULY 1944, and following days. Last date for receiving Applications, SATURDAY, 20th MAY 1944.

Forms of Application for permission to sit at either Examination may be obtained from : " The Secretary, Royal Agricultural Society of England, 16 Bedford Square, London W.C.1." or from " The Secretary, Highland and Agricultural Society of Scotland, 8 Eglinton Crescent, Edinburgh, 12."

SYLLABUS OF SUBJECTS OF EXAMINATION.

PRACTICAL AGRICULTURE.

1.—FIRST PAPER.

1. *British Farming.*—Arable, stock-raising, dairying—Approximate areas covered by the different systems—Typical examples of each—Area in Great Britain under chief crops—Numbers of live stock—The recent history of agriculture—Short summary of agricultural returns.

2. *Climate.*—The effect of climate on farming practice—Rainfall—Temperature—Prevailing winds—Weather forecasts.

3. *Soils.*—The influence of geological formations on the systems of farming—Classification of soils—Character and composition—Suitability for cultivation. Reclamation—Drainage—Irrigation—Warping—Application of lime and marl—Bare fallows—Tillage—Subsoiling—Deep and thorough cultivation.

4. *Manures*.—The manures of the farm—The treatment of farm-yard manure—The disposal of liquid manure and sewage—General manures—Special manures—Field trials of manures—The application of manures—Period of application and amounts used per acre—Unexhausted value of manures and feeding-stuffs.

5. *Crops*.—Wheat, barley, oats, rye, beans, peas, potatoes, turnips, swedes, mangolds, sugar beet, forage plants, hops, and other crops—Their adaptation to different soils and climates—Varieties—Selection of seed—Judging seeds—Cultivation, weeds and parasitic plants, best methods of prevention and eradication—Harvesting—Storing—Cost of production—Improvement of crops by selection and hybridising—Field trials—Methods which the farmer may adopt—Selection to resist disease—The principles of rotations—Rotations suitable for different soils and climates—Rotations and the maintenance of fertility—Green manuring—Leguminous crops in rotation—Catch crops—The advantages and disadvantages of rotations—Specialised farming—Management of Orchards.

2.—SECOND PAPER.

6. *Live Stock*.—The different breeds of British live stock—Their origin, characteristics, and comparative merits—Suitability for different districts—Broeding—General principles—Selection—Mating—Crossing—Rearing and general management—Breeding and rearing of horses, cattle, sheep, pigs, and poultry. Rearing colts and raising store stock—The foods of the farm—Their composition and suitability for different classes of stock—Purchased foods—Composition and special value—Rations for different kinds and ages of stock—Cost of producing beef, mutton, pork, and milk—Cost of feeding farm horses.

7. *The disposal of Crops, Produce, and Stock*.—Marketing grain and other crops—Sale of stock—Live weight—Dead weight.

8. *Milk*.—The production and treatment of milk—The manufacture of cheese, butter, &c.—The utilisation of by-products.

9. *Farming Capital*.—Calculations of the stocking and working of arable, stock, and dairy farms—Farm valuations—Rent and taxes.

10. *Labour*.—Organisation of labour—piece-work, time-work—labour costings.

11. *Renting a Farm*.—Indications of condition, productive power, and stock-carrying capacity—Leases—Conditions of occupancy.

N.B.—*It is essential that a candidate know his subject practically, and that he satisfy the Examiner of his familiarity with farm work and management.*

3.—FARM MACHINERY AND IMPLEMENTS.

1. *Power*.—The principle of action, construction, method of working, also care and management of steam engines and boilers, gas, oil and petrol engines and agricultural tractors. Cost and working expenses in connection with the above. Estimation of the brake horse-power of engines. Power derived from water. Measurement of the quantity of water flowing in a stream. General arrangement of water-power plants. Water-wheels. Turbines. Pumps—

principle of action and construction. Flow of water through pipes. Hydraulic ram. Windmills.

2. *Agricultural Implements and Machinery.*—The mode of action and the general principles involved in the construction and working of farm implements and machinery. Arrangements of machinery with respect to the power plant. Pulleys and belting. Shafting and bearings. Lubrication. Lifting appliances. Strength and care of chains. Concrete and its use in the construction of simple foundations for engines and machines.

3. *Implements of Cultivation.*—Ploughs—Cultivators—Grubbers—Harrows—Drills. Manure Distributors. Seeding and planting implements.

4. *Implements of Harvesting.*—Mowing and Reaping machines—Rakes—Teddies—Elevators—Potato raisers.

5. *Implements of Transit.*—Carts, waggon, rick lifters, tractors.

6. *Threshing and Food-preparing Machinery.*—Threshing machines, stationary and portable—Screen Winnowers—Hummelers, Chaff cutters—Pulpers—Cake breakers.

7. *Dairy Appliances.*—Milking machines—Cream separators—Churns and other butter-working appliances—Milk delivery cans—Cheese-making utensils—Vats and presses.

N.B.—Candidates are expected to have had some experience with agricultural machinery and implements under actual working conditions, and to be capable of illustrating their answers, when necessary, by intelligible sketches or diagrams.

4.—LAND SURVEYING AND FARM BUILDINGS.

1. The use and adjustment of instruments employed in Surveying and Levelling other than the Theodolite.

2. Land surveying by chain, Plotting from field book, and determination of areas surveyed. The simpler "field problems."

3. Levelling and plotting from field book.

4. A knowledge of the various classes of maps published by the Ordnance Survey Department and their Scales.

5. *Roads and Fences.*—The construction and maintenance of farm roads, fences, and ditches.

6. *Land Drainage.*—Methods of draining; mole and pipe drains; cost of construction and maintenance.

7. *Buildings.*—Buildings required on different classes of farms—Economical arrangement of farm buildings—Materials—Construction—Ventilation—Drainage—Water supply—Dimensions of dairy, stables, cow-sheds, yard, courts, and piggeries—Accommodation for power—Implement, machinery, and cart sheds—Hay and grain sheds—Shelter sheds—Storage of manure.

N.B.—Each candidate should have with him at the Examination a pair of compasses, scales of equal parts, including scales of one chain to the inch, 4 feet to the inch, 8 feet to the inch, and the scale fitting the Ordnance Map, $\frac{1}{25000}$ or 25·344 inches to the mile, a small protractor, a set-square, and a straight-edge about 18 inches in length.

5.—AGRICULTURAL CHEMISTRY.

1. *The Atmosphere*.—Its composition and relations to plant and animal life.

2. *Water*.—Rain water—Soil water and drainage—Drinking water—Sewage and irrigation.

3. *The Soil*.—Origin, formation, and classification of soils—Sampling—Analysis—Composition of soils—The chemical and physical properties of soils—The water and air of the soil—Biological changes in the soil—The soil in relation to plant growth—Fertility—Causes of infertility—Improvement of soils.

4. *Manures*.—Theories of manuring—Classification of manures—Origin, nature, and characteristics of manures—Manufacture of manures—Composition, analysis, adulteration, and valuation of manures—Farmyard manure and other natural manures—Green-manuring—Liming, marling, claying—Artificial manures, their origin and manufacture—Fertilisers and Feeding Stuffs Act—Sampling of manures.

5. *Poisons, Antiseptics, and Preservatives*.—General chemical composition and character of insecticides, fungicides, antiseptics, and preservatives used on the farm.

6. *Plants and Crops*.—Constituents of plants—Assimilation and nutrition of plants—Sources of the nitrogen and other constituents of plants—Germination—Action of enzymes—Composition and manurial requirements of farm crops—Food products derived from crops—Manuring experiments.

7. *Animals*.—Composition of animal body—Animal nutrition—Digestion—Assimilation, metabolism, respiration, and excretion.

8. *Foods and Feeding*.—Constituents of foods—Origin, nature, and composition of chief feeding stuffs—Sampling, analysis, and adulteration of foods—Nutritive value and digestibility of food—Functions of chief food constituents—Energy values—Vitamins—Relation of foods to the production of work, meat, milk, and manure—Manurial residues of foods.

9. *Dairy Chemistry*.—The composition of milk, cream, butter, cheese, &c.—Conditions which influence the composition of milk and milk products—Action of ferments and enzymes on milk and milk products—Milk-testing—Analysis and adulteration of dairy products.

N.B.—*Candidates who are in possession of Laboratory Notes are required to bring them to the Oral Examination in this subject.*

6.—AGRICULTURAL BOTANY.

In addition to a *general knowledge* of the morphology, histology, and physiology of plants, candidates will be expected to possess a *detailed knowledge* of the following subjects:—

The classification of plants of importance in agriculture as shown by a detailed study of the genera, species, and botanical varieties of the British Crop Plants and Weeds included in the following families:—

Ranunculaceæ.	Umbelliferae.	Chenopodiaceæ.
Cruciferae.	Compositæ.	Polygonaceæ.
Caryophyllaceæ.	Solanaceæ.	Liliaceæ.
Leguminosæ.	Scrophulariaceæ.	Gramineæ.
Rosaceæ.	Labiatae.	

British grasses of agricultural importance: recognition of, at any stage of growth. Habitats of important species. Constitution of the grass flora of good meadows and pastures. Composition of seed mixtures for temporary and permanent leys on various soils. The effects of artificial manures on the flora of grass land.

The weeds of arable and grass land. Poisonous and parasitic weeds. Methods of distribution by seed and vegetatively: of eradication. Weeds as soil indicators. Recognition of the seeds of the common weeds, particularly those characteristically found in clover, grass, &c., seed.

The chief varieties of wheat, barley, oats, clovers, roots, and other farm crops; their suitability for various climatic and soil conditions. The identification of the more important types of cereals by means of their grain characters. Characteristics of good and bad samples of cereals.

Identification of materials used in feeding cakes and meals.

Plant-breeding. Principles of heredity in plants. Pure lines. Fluctuating variability. Selection.

Disease in plants. Diseases due to the effects of parasitic fungi. Resistance to disease: conditions affecting. Fungoid diseases scheduled from time to time by the Ministry of Agriculture and Fisheries.

Yeasts and fermentation.

The general outlines of bacteriology: nitrogen fixation, nitrification, and denitrification. Putrefaction and the bacteriology of milk, butter, and cheese.

N.B.—Candidates who are in possession of Laboratory Notes are required to bring them to the Oral Examination in this subject.

7.—AGRICULTURAL BOOK-KEEPING.

1. Advantages of book-keeping to the farmer. Difficulties and how they can be overcome. Objects of book-keeping.

2. General principles of book-keeping. Double-entry system. Description and use of various books. Ledger, journal, cash-book, petty cash-book, day-books, &c. Entering transactions; posting; trial balance; closing the accounts. Single-entry system.

3. Special ledger accounts: Interest, depreciation, rent and rates, improvements, private and household expenses, profit and loss and capital; partnership accounts.

4. Bank business. Opening a bank account. Use of cheques. Deposits and overdrafts.

5. General office work; correspondence, order notes, invoices, rendering accounts, receipts, &c. Filing systems.

6. Farm valuations for book-keeping purposes. Dates for stock-taking and principles of valuation. The farm balance-sheet.

7. Systems of farm book-keeping. Conditions that determine the most suitable system. Advantages and drawbacks of each system.

8. Accounts for the owner-occupier. Treatment of rent. Incidence of rates and tithe in England and Scotland, and their treatment as between farm and estate accounts. Improvements and upkeep and the general principles relating to maintenance claims.

9. Cost accounting. General principles and methods. Advantages, objects, difficulties.

10. Interpretation of results from ordinary and from cost accounts. Precautions necessary. Use of accounts as a guide to efficient management.

11. Income Tax. How the farmer is assessed. Preparation of Income Tax return. Treatment of Income Tax in accounts.

8.—AGRICULTURAL ZOOLOGY.

The Examination is designed to test practical knowledge, and therefore Candidates will be expected to recognise the animals of agricultural importance referred to in the Syllabus.

GENERAL.

A general knowledge of the characteristics of living animals and how they differ from plants.

One-celled animals, *e.g.*, Amœba, and many-celled animals.

General outline of the classification of animals and the characters on which it is based.

Organic Evolution. Theories of Heredity.

SPECIAL.

I. *Invertebrates*.—A. The Worm Parasites of Stock. Flat and Round Worms. Structure and Life History, for example, of Liver-fluke, Tapeworm, Ascaris. The mode of life and life history of the chief worm enemies of the domesticated animals. Preventive and remedial measures.

B. The Arachnid enemies of Stock : Mange or Scab Mites, Demodex Mites, Ticks. External structure and life history. Control measures.

C. The Insect enemies of Stock : (a) External parasites, *e.g.*, gadflies, warble flies, blue-bottles, green-bottles, stable fly, ked, lice ; (b) Internal parasites, *e.g.*, bot and warble flies.

D. Insects injurious to Crops : Structure and classification of insects. Mode of life and life history of the chief insect pests of agricultural crops.* Control, preventive and remedial measures—natural control ; artificial control (Insecticides).

* *The chief pests are detailed in Pamphlets issued by the Ministry of Agriculture and Fisheries.*

E. Other invertebrates of agricultural importance, *e.g.*, earth-worms, eelworms, slugs and snails, centipedes and millepedes, gall mites.

II. *Vertebrates*.—Birds : the commoner birds of farm importance, their recognition and an estimate of their work.

Mammals : Outstanding characters for recognition, and the economic importance of :—

1. Ungulata or Hoofed Mammals, *e.g.*, horse, pig, cattle, sheep, deer.
2. Rodentia or Gnawing Mammals, *e.g.*, hares, rabbits, rats, mice, voles, squirrels.
3. Insectivora, *e.g.*, mole, hedgehog, shrew.
4. Carnivora, *e.g.*, dog, fox, polecat, stoat, weasel, badger.

N.B.—*Candidates who are in possession of Laboratory Notes are required to bring them to the Oral Examination in this subject.*

9.—VETERINARY SCIENCE AND HYGIENE.

1. Elementary anatomy and physiology of the horse, ox, sheep, and pig, and their relation to unsoundness and disease.

2. The general principles of breeding—including the physiology of reproduction, the laws of heredity, the periods of gestation, and the signs of pregnancy in the mare, cow, ewe, and sow.

3. Dentition as a means of determining the age of horses, cattle, sheep, and swine.

4. The management of farm stock in health and disease.

N.B.—Candidates who are in possession of Laboratory Notes are required to bring them to the Oral Examination in this subject.

WINNERS OF DIPLOMA IN 1943.

Diploma with Honours.

WILLIAM HOLMES, University of Glasgow and West of Scotland Agricultural College.

Diploma.

HAROLD HEReward GATES ARMSTRONG, University of Reading.

JANE MARGARET BATTEN, University of Reading.

GERALD HUGH CAUDWELL, Harper Adams Agricultural College.

CHARLES ALAN COCKSHOTT, University of Leeds.

JOHN RUSSELL COWPER, University of Glasgow and West of Scotland Agricultural College.

THOMAS WILLIAM HENRY DANGER, Harper Adams Agricultural College.

CHRISTOPHER ROBERT DEACON, Midland Agricultural College.

CLIVE HUBERT DIXON, Harper Adams Agricultural College.

NORMAN ALFRED EDMUNDSON, Midland Agricultural College.

ARTHUR JOHN EVANS, Midland Agricultural College.

PETER HARRIS FINLAY, University of Reading.

JAMES ALEXANDER GILLESPIE, Edinburgh and East of Scotland College of Agriculture.

FREDA MARGARET HAMPSON, Midland Agricultural College.

DESMOND JOHN HARRIS, Seale Hayne Agricultural College.

HAROLD AUSTIN HILL, Harper Adams Agricultural College.

JOHN CHARLES HOCKEN, Seale Hayne Agricultural College.

FINLAY WATT HUTCHISON, Edinburgh and East of Scotland College of Agriculture.

ANTONY BERNARD JEAVONS, Harper Adams Agricultural College.

PATRICK HOWARD JEAVONS, Harper Adams Agricultural College.

RALPH EDWIN JOAD, University of Reading.

IAN KINLOCH, West of Scotland Agricultural College.

CHARLES HENRY MALPASS, Harper Adams Agricultural College.
JOHN RICHARD MASON, Harper Adams Agricultural College.
DAPHNE PRISCILLA METCALFE, University of Reading.
JOHN EDWARD PARK, King's College, Newcastle-on-Tyne.
RONALD BENJAMIN PEARCE, University of Glasgow and West of
Scotland Agricultural College.
CHARLES WARWICK PERCY, King's College, Newcastle-on-Tyne.
FRANK ARTHUR WALTER PEREGRINE, Harper Adams Agricultural
College.
JOHN DOWLAND RANGELEY, Harper Adams Agricultural College.
ALFRED JOSEPH BRAGINTON RATCLIFFE, Harper Adams Agricultural
College.
JOHN DUDLEY RIDGE, Harper Adams Agricultural College.
WILLIAM DENNIS CHAPMAN RILEY, Midland Agricultural College.
JOHN EYRE RUSSELL, Midland Agricultural College.
SHEILA CAROLINE ADA STURGESE, Midland Agricultural College.
STEPHEN GEORGE WEISZ, University of Leeds.
JOHN DONALD WOODHOUSE, Seale Hayne Agricultural College.

EXAMINATION PAPERS OF PAST YEARS.

Copies of papers set at past Examinations in AGRICULTURE, so far as available, may be had on application. Price 1/- per set.

Sets of N.D.A. Papers available are those for the years 1938, 1939, 1941, 1942, 1943, 1944 (April), 1944 (July).

NATIONAL DIPLOMA IN DAIRYING

This Examination, instituted in 1897, is conducted by "The National Dairy Examination Board," appointed jointly by the Royal Agricultural Society of England, the Highland and Agricultural Society of Scotland, and the British Dairy Farmers' Association.

REGULATIONS FOR EXAMINATION IN THE SCIENCE AND PRACTICE OF DAIRYING

EXAMINATION IN 1944.

1. The Societies may hold annually in England and Scotland, under the management of the National Dairy Examination Board appointed by them, one or more examinations for the National Diploma in the Science and Practice of Dairying, on dates and at places from time to time appointed and duly announced; the Diploma to be distinguished shortly by the letters 'N.D.D.'

2. Forms of entry for the Examination in England may be obtained from "The Secretary, Royal Agricultural Society of England, 16 Bedford Square, London, W.C.1." and must be returned to him duly filled up, with the entry fee, on or before 20th July 1944.

3. Forms of entry for the Examination in Scotland may be obtained from "The Secretary, Highland and Agricultural Society of Scotland, 8 Eglinton Crescent, Edinburgh 12," and must be returned to him duly filled up, with the entry fee, on or before 31st July 1944.

4. Any candidate may enter for the Examination either in England or Scotland, but not in both, and a candidate who has once taken part in an Examination in England cannot enter for an Examination in Scotland, or *vice versa*. *An exception may be made in favour of a candidate reappearing under Regulation 10 (3) provided special application is made at the time of entry.*

5. As a preliminary to the acceptance of any application for permission to enter for the Examination, a candidate must produce:—

(1) from the Head of an approved Dairy Training College or Institute:

(a) a statement that he or she is in possession of the General School Certificate (England), the Day School Certificate Higher (Scotland), or the School Certificate of the Central Welsh Board; or a statement that his or her general education is of an equivalent standard;

- (b) a certificate testifying that he or she has satisfactorily completed courses in (i) soils, crops, rotations, cultivations, manuring of crops (other than pastures), and plant physiology; (ii) elementary chemistry, physics and mechanics, and
- (c) that he or she has also attended a Diploma or Degree course in the subjects of the Examination covering at least two academic years at an approved Dairy Training College or Institute, and has satisfied the authorities of the College or Institute of his or her fitness for admission to the Examination. *This period shall include six months' instruction (consisting of not more than two periods) in practical dairy work.*
- (d) a certificate of proficiency in soft cheese-making.

- (2) a certificate of proficiency in the milking of cows, signed by a dairy farmer, and evidence that he or she has spent at least six months in not more than two periods on an approved dairy farm and taken part in the work, both in the dairy and on the land. *This period must not run concurrently with the six months' practical training referred to in sub-section 1 (c).*

A Dairy Farm to be approved must have not fewer than fifteen cows in milk.

6. A candidate who has already taken a Degree in Agriculture of a British University, or a Diploma in Agriculture recognised by the National Dairy Examination Board, will be allowed to enter for the National Diploma in Dairying Examination after one year's subsequent training at an approved Dairy Training College or Institute, providing that such course includes at least six months' training in practical dairy work, and that he or she has spent at least six months on an approved dairy farm, and taken part in the work both in the dairy and on the land.

7. In the Examination a candidate will be required to satisfy the Examiners by means of written papers, practical work, and *viva voce*, that he or she has :—

- (1) A general knowledge of the management of a dairy farm, including the rearing and feeding of dairy stock, the candidate being required to satisfy the Examiners that he or she has had a thorough training and practical experience in all the details of dairy work as pursued on a farm.
- (2) A thorough acquaintance with the practical details of the management of a dairy, and the manufacture of butter and cheese, together with a working knowledge of the scientific principles involved in these operations.
- (3) A general knowledge of dairy book-keeping.
- (4) Practical skill in dairying, to be tested by the making of butter and cheese.

NOTE.—A candidate must be prepared to make any one of three varieties of Hard Pressed Cheese, two of which must be Cheddar and Cheshire, these three to be specified on his application form, the Examiner in Cheese-making having the option of saying, during the Examination, which a candidate shall make.

8. Candidates will have the option of :—

- (a) Taking the whole Examination at one time ; or
- (b) Taking the Examination in two parts.

A candidate taking the Examination in two parts must take the following subjects at the first sitting: DAIRY HUSBANDRY, MILK AND MILK PLANT, CREAM AND BUTTER, CHEESE AND CHEESE PRODUCTS, PRACTICAL CHEESE-MAKING AND BUTTER-MAKING ; the remaining three Papers, DAIRY CHEMISTRY, DAIRY MICROBIOLOGY, and DAIRY BOOK-KEEPING, at the Examination in the following year.

9. The maximum marks obtainable and the marks required for a pass in each subject are :—

WRITTEN AND ORAL EXAMINATION—		Max.	Pass.
Dairy Husbandry . . . (3 hours' paper)		150	90
Milk and Milk Plant . . . (2 hours' paper)		100	60
Cream and Butter . . . " "		100	60
Cheese and Cheese Products . . . " "		100	60
Dairy Chemistry . . . " "		100	60
Dairy Microbiology . . . " "		100	60
Dairy Book-keeping . . . (3 hours' paper)		100	50
PRACTICAL EXAMINATION—CHEESE-MAKING—			
(a) One of the three Hard Pressed cheeses specified by the candidate on his form of application		200	150
(b) Blue-veined		100	75
BUTTER-MAKING		200	150
		<hr/> 1250	<hr/> 815

Honours will be awarded to candidates obtaining an aggregate of 80 per cent (1000) of the maximum marks (1250) in the Examination, provided that they also obtain at least 80 per cent (360) of the maximum marks (450) in the Dairy Husbandry, Milk and Milk Plant, Cream and Butter, and Cheese and Cheese Products papers.

10. A candidate taking the whole Examination at one time :—

- (1) who fails in any part of the practical examination shall fail in the whole examination.
- (2) who fails in four or more subjects of the written examination shall fail in the whole examination.
- (3) who, having passed in the practical examination, fails in not more than three subjects of the written examination may, at the discretion of the Board, appear for those subjects in the following year.

11. A candidate taking the Examination in two parts, and failing in a single subject in the first part of the Examination, may, at the discretion of the Board, appear for that subject along with the second part ; or, in the case of a single subject of the second part, in the following year.

Failure in more than one subject will be regarded as failure in that part of the Examination. Failure in any part of the Practical Examination will entail complete failure.

12. In all cases of failure, either in the whole Examination or in part thereof, the Board will require evidence of further study before a candidate is again admitted to the Examination.

13. The entrance fees will be as follows :—

For the whole Examination taken at one time	.	£3	3	0	
For the Examination taken in two parts :					
First part	.	.	3	3	0
Second part	.	.	1	1	0
For reappearance, 10s. 6d. each subject.					

14. The Board reserve the right to postpone, to abandon, and to modify an Examination, and also to decline to admit any particular candidate to the Examination.

DATES OF EXAMINATIONS.

SCOTLAND.— At the Dairy School for Scotland, Auchincruive, Ayr.
WRITTEN—WEDNESDAY, THURSDAY, and FRIDAY, 6th, 7th, and 8th SEPTEMBER 1944. ORAL AND PRACTICAL—
MONDAY, 18th SEPTEMBER 1944, and following days. Last date for receiving Applications, MONDAY, 31st JULY 1944.

ENGLAND.— At the University and British Dairy Institute, Reading.
WEDNESDAY, 6th SEPTEMBER 1944, and following days. Last date for receiving Applications, THURSDAY, 20th JULY 1944.

SYLLABUS OF SUBJECTS OF EXAMINATION

I.—DAIRY HUSBANDRY.

Buildings of the dairy farm ; structural features, sanitation, and water supply.

Selection, stocking, and equipment of typical dairy farms ; organisation of the dairy farm.

The utilisation of the crops of the dairy farm.

Pastures and pasture management ; dried grass, silage.

Foods used on the dairy farm ; characteristics and relative value.

Live stock of the dairy farm ; essential conformation features of the dairy cow and dairy bull ; British dairy breeds ; milk recording.

Breeding of dairy stock, principles and practice ; selection, care, and management of the sire ; calf rearing ; raising of dairy heifers.

Management of dairy herds ; self-contained herds ; attested herds.

Feeding of dairy cows for milk production ; feeding standards ; construction and use of rations.

Common ailments and diseases of dairy stock : milk fever, bloat, cow pox, mastitis, contagious abortion, tuberculosis, Johne's disease, sterility, scour, hoose, notifiable animal diseases.

Hygienic milk production ; hand and machine milking ; cleaning and care of milking machines and utensils used in milk production ; milk coolers and farm sterilising equipment.

Pigs on the dairy farm ; suitable breeds for bacon and for pork production ; housing accommodation ; breeding, feeding, and management of pigs ; fattening of pigs ; pig recording ; common ailments and diseases of pigs.

II.—MILK AND MILK PLANT.

Utilisation of milk and milk products in Great Britain ; sources of supply ; the principles of organised marketing. Milk contracts.

Properties of milk.

Variations in the composition of milk ; legal minimum standards for milk ; statutory rules and orders relating to milk and milk products.

Sources of taints and contamination in milk. Abnormal milk. Flavour in milk and the contributing factors.

Grades of milk.

Food value of milk. Hard and soft curd milk.

Transportation of milk ; milk churns ; road and rail tanks ; processing of milk at milk depots ; sampling and testing of milk ; effects of heat on milk ; essentials for efficient pasteurisation ; progressive stages in milk treatment at milk plants ; weighing ; filtering ; clarifying, pumping, pasteurising, cooling, bottling, and capping ; refrigeration ; cold storage.

Disposal of wastes from milk plants.

Distribution of milk.

Special treatment of milk ; homogenisation, irradiation, stassanisation, commercial sterilisation, high temperature, short time heat treatment.

Fermented milk preparations, Yoghurt, Kefir, and cultured butter milk.

Elementary principles of condensing and drying of milk.

III.—CREAM AND BUTTER.

Cream.—Production and consumption of cream in Great Britain. Utilisation of cream ; grades of cream, regulations for the sale of cream ; different methods of obtaining cream from milk.

Operation and management of cream separators, hand and power.

Efficiency of separation ; cleaning and sterilisation of separators.

Testing of cream.

Factors influencing the flavour, physical properties, and keeping qualities of cream ; homogenisation of cream.

Pasteurisation of cream ; cooling and storage ; marketing of cream.

Cream preparations ; whipped cream, clotted cream, sterilised cream, reconstituted cream.

Cream appliances, homogenisers, cream sterilising plant, pasteurisers, cream coolers.

Ice Cream.—Types of plant used. Materials used in, and preparation of mixes. Pasteurising, ripening, freezing, and hardening.

Butter.—Production and consumption of butter in Great Britain ; sources of imports.

Food value of butter ; regulations governing the production and sale of butter.

Selection and grading of cream for butter-making.

Treatment of cream prior to churning ; heating, cooling ; preparation and use of starters.

Churning of cream ; factors affecting churning and loss of butter fat.

Washing of butter ; purity of wash water.

Methods of working and salting of butter ; quality of salt.

Packing of butter and treatment of liners and butter boxes ; storage of butter ; refrigeration in factories and in transport.

Grading and judging butter. National Mark butter. Common defects in butter and their causes.

Special systems of butter-making ; sweet cream butter ; whole milk butter ; neutralised cream butter ; whey butter.

Utilisation of by-products of butter-making ; separated milk and butter milk. Casein.

Butter-making equipment ; separators ; pasteurising plant, cream coolers, cream pumps, starter-preparing apparatus, cream ripeners, churns and butter workers. Butter packers, moulders and blenders, butter cutting, and wrapping machines.

IV.—CHEESE AND CHEESE PRODUCTS.

Production and consumption of cheese in Great Britain ; sources of imports.

Food values of cheese.

Principles of cheese-making ; varieties of cheese.

Hard-pressed cheese. Agents used in manufacturing process ; starter, colour, rennet, salt.

Milk for cheese-making ; care and management.

Detailed knowledge of the manufacture of Cheddar and Cheshire, and one of the following : Derby, Dunlop, Leicester, Gloucester, or Lancashire.

Manufacture of cheese from pasteurised milk.

Small hard-pressed cheeses : Caerphilly, Smallholder, &c.

Difficulties experienced in the manufacturing process ; causes of fast and slow working, gas formation, ropy and slimy whey.

Ripening and storage of cheese.

Grading and judging of cheese ; National Mark standards.

Marketing of cheese.

Defects in the flavour, body, and texture, and in the colour of mature cheese.

Manufacture of Stilton and Wensleydale cheeses, blue-voined and white.

Soft cheese-making.

Cream cheeses. Single and double cream cheeses.

Cheese products. Manufacture of processed cheese, and cheese spreads.

Usual cheese factory equipment and arrangement ; cheese vats,

curd knives, curd agitator, cheese press, curd mill; cheese hoops, cheese turners, paraffining apparatus, pasteurising equipment, air conditioning plant.

Utilisation of whey.

V.—DAIRY CHEMISTRY.

The principal constituents of foodstuffs and the functions they fulfil. Assimilation and digestion. Vitamins.

The nature and composition of milk, colostrum, butter, cheese, cream, separated milk, butter milk, whey, casein, and lactose.

Drying and condensation of milk and milk products.

Variation in composition of milk.

Milk souring, rennet coagulation, preparation and ripening of cheese, storage of butter, salt for dairy purposes.

Metals and their influence on milk and milk products. Taints. Effects of heat on milk. Abnormal milk.

The sampling and analysis of milk and milk products. Freezing point test for milk.

Commercial routine analysis of foodstuffs.

Chemical aspects of water supply.

Dairy detergents and disinfectants.

N.B.—Candidates are required to bring to the Oral Examination in this subject their Laboratory notebooks certified by their teachers as being the record of their Laboratory work carried out during the course.

VI.—DAIRY MICROBIOLOGY.

GENERAL.—The bacteria, yeasts, and moulds which commonly occur in milk and dairy products; their form, classification (in the case of the bacteria—Topley and Wilson's), growth and reproduction. Factors which control rate of growth. Fermentations of importance in dairying; causal micro-organisms and conditions which influence activity.

MILK.—Microbiology of milk production; sources of contamination, their relative importance and organisms derived from them. Normal changes produced by micro-organisms in milk. Abnormal changes; ropiness, premature curdling, gas formation, bitter, yeasty and malty flavours and flavour of roots and feeding-stuffs; causal organisms and methods of prevention. Effects of straining, centrifuging, cooling, heating, condensing, drying, and preservatives on the microflora of milk. Bacteriology of pasteurised and sterilised milk; influence of quality of raw milk. Standards for graded milks.

MILK PRODUCTS.—Starters; their propagation and management. Ripening of cream; development of normal flavour. Microbiology of butter. Ripening of hard, soft, and blue-veined cheese; factors concerned and their control. Microbiology of condensed, dried, and fermented milks. Defects of dairy products, causal organisms and

preventive measures ; butter defects—rancidity, yeasty and cheesy flavours, coloured spots ; cheese defects—gas formation, bitterness, slow acid development and excessive acidity, colour changes ; defects of condensed milk—gas formation, “ buttons,” coagulation.

DISEASES.—Diseases which may be conveyed by milk ; sources of infection. Bacteriology of tuberculosis, contagious abortion, mastitis and methods of detection. Immunity ; vaccines. Disinfection.

WATER.—The importance of a pure water supply for the dairy and the herd. Bacteria commonly present in natural waters. Sources of contamination, the effect of pollution with sewage, water-borne disease.

LABORATORY WORK.—The microscope and its use. Staining (including Gram and Ziehl-Neelsen methods), and microscopic examination of micro-organisms. Methods of isolation and cultivation. Preparation of bile-salt broth, milk, milk agar, and Wilson's agar. Methods for the examination of milk ; plate method, post-pasteurisation count, coliform test, Breed's method and the methylene blue reduction, fermentation, acidity and catalase tests. Methods for tracing sources of contamination and of milk faults. Detection of thermophilic, thermoduric, and pathogenic organisms in milk. Examination of water supplies.

N.B.—Candidates are required to bring to the Oral Examination in this subject their Laboratory notebooks certified by their teachers as being the record of their Laboratory work carried out during the course.

VII.—DAIRY BOOK-KEEPING.

Reasons for keeping accounts on the farm and in the dairy factory.

General principles of double-entry book-keeping. Use of day-book, journal, ledger, cash-book, and petty-cash book. Preparation of profit and loss account, capital account, and balance-sheet. Adjustments necessary for the owner-occupier.

Analysis cash-book.

Valuations.—Bases of valuations for accounting purposes on the farm and in the dairy factory. Dates for stock-taking. Stock books and quantitative records.

Methods of accounting suitable for dairy farms with varying systems of milk disposal.

Opening and operating a bank account. Cheques, deposits, and overdrafts.

Assessment of the farmer for Income Tax purposes.

WINNERS OF DIPLOMA IN 1943.

SCOTTISH CENTRE.

(All the candidates at the Scottish Centre, with one exception, had been students at the Dairy School for Scotland, Auchincruive, Ayr.)

Diploma.

- RUTH ELEANOR AKERIGG ALLAN, Heatherlea, Lindisfarne Road, Newcastle-on-Tyne, 2.
 ELIZABETH BARR, Harelaw Farm, Lanark.
 JESSIE MERSON BEWS, 222 Brownside Road, Burnside, Rutherglen, Glasgow.
 CLARA ELLEN BOOTH, c/o Watson, 22 Dowanside Road, Glasgow, W.2.
 JOHN EDMUND BROOKE, 13 The Crescent, Tadcaster, Yorks.
 PETER JULIAN BROUGHTON-HEAD, 163 Bath Street, Glasgow, C.2.
 CHARLES ALAN COCKSHOTT, Sanfitt, Addingham, Ilkley, Yorks.
 MARGARET DODDS COLTHERD, The Glen, Innerleithen, Peeblesshire.
 JANE ANN CHESSOR CRABB, 45 High Street, New Aberdour, Fraserburgh, Aberdeenshire.
 TOM TURNER EASTWOOD, 156 Skipton Road, Colno, Lancs.
 JARMILA ELSNEROVA, 2 Custom House Street, Aberystwyth (University College of Wales).
 JAMES CHARLES PETER FERNANDEZ, c/o Dr J. Fernandez, Byculla, Bombay, India.
 JANET MARTIN FLEMING, Wester Kinleith, Currie, Midlothian.
 ELEN IZOBEL GARVIE, 32 Great Smith Street, Westminster, London, S.W.1.
 EVELYN IMRIE, Bank House, Kinlochleven, Argyll.
 IAN KINLOCH, South Drumry Farm, Drumchapel, Glasgow.
 ROBERT DOUGLAS BROWN KIRKWOOD, 6 Cunninghame Road, East Kilbride, Lanarkshire.
 JOHN ROBINSON LANE, 42A Hartley's Buildings, King Street, Morley, near Leeds.
 THOMAS DUNCAN M'CLIMONT, Ormlie, 97 Kirk Street, Strathaven, Lanarkshire.
 CATHERINE CHRISTINA M'NAUGHTON, Monachyle, Balquhiddy, Lochearnhead, Perthshire.
 M. BARBARA MORRISON, Kirkibost, Bernera, Stornoway, Isle of Lewis.
 ISABELLA D. MURISON, "Cranbrook," Aberlour-on-Spey, Banffshire.
 GORDON MURRAY, "Marandellas," 23 Peveril Avenue, Burnside, Glasgow.
 JOHN EDWARD PARK, Oakwood Farm, Styal, near Manchester.
 PATRICIA MARY PERROW, 107 Octavia Terrace, Greenock, Renfrewshire.
 IDA M. C. STUART, St Mary's, Orton, Morayshire.
 MARY ISABELLA TINDALE, 40 Woodbine Road, Gosforth, Newcastle-on-Tyne, 3.
 JOE WEST WHALLEY, Brow End Farm, Laycock, Keighley, Yorks.
 DOROTHY MARGARET WHYTE, 6 Lothian Gardens, Glasgow, N.W.
 ANNABELLA MAIR WYLLIE, Nether Barr, Barr, by Girvan, Ayrshire.

ENGLISH CENTRE.

Diploma.

- DORIS BARBARA ALLEN, The University and British Dairy Institute, Reading.
- MARY RUTH ALLSEBROOK, Studley College, Warwickshire.
- MARY ARMITAGE, Midland Agricultural College, Sutton Bonington.
- KATE MARGARET BAGENAL, Studley College, Warwickshire.
- MARGARET ELIZABETH BARNARD, Studley College, Warwickshire.
- JANE MARGARET BATTEN, The University and British Dairy Institute, Reading.
- SHEILA MARY BLOXHAM, Midland Agricultural College, Sutton Bonington.
- PENELOPE MARGARET BOWYER, Studley College, Warwickshire.
- BARBARA MARGUERITE BRADLEY, The University and British Dairy Institute, Reading.
- DORIS LOUISA COURT, The University and British Dairy Institute, Reading.
- THOMAS JOHN COLWYN DAVID, University College of Wales, Aberystwyth.
- SARAH DUNNING, The University and British Dairy Institute, Reading.
- ANNE MARGARET DURAND, The University and British Dairy Institute, Reading.
- MARGARET ROSALIND ELLIOTT, The University and British Dairy Institute, Reading.
- DERWENT ELLIS, The University and British Dairy Institute, Reading.
- HANNAH H. FRANKEL, The University and British Dairy Institute, Reading.
- ALICE JEAN FROST, Seale Hayne Agricultural College, Newton Abbot, and Midland Agricultural College, Sutton Bonington.
- MARGARET J. FRYER, Studley College, Warwickshire.
- BARBARA MARY GLASON, The University and British Dairy Institute, Reading.
- GLADYS LILY GREEN, Midland Agricultural College, Sutton Bonington.
- WILNA GREENWOOD, Midland Agricultural College, Sutton Bonington.
- ANDREI HIRSCH, The University and British Dairy Institute, Reading.
- MARGARET JOHANNA DE IONGH, The University and British Dairy Institute, Reading.
- MARGARET MARY HENLLYS JONES, University College of Wales, Aberystwyth.
- LUCIE PATRICIA LOMAX KENDAL, Studley College, Warwickshire.
- DAPHNE PRISCOILLA METCALFE, The University and British Dairy Institute, Reading.
- EDITH JEAN PHILPOTT, The University and British Dairy Institute, Reading.
- ELIZABETH MARY PILLMAN, Studley College, Warwickshire.
- ELIZABETH MARJORIE ROBERTSON, Studley College, Warwickshire.
- EDITH RUSSELL, Midland Agricultural College, Sutton Bonington.

HELEN PURCELL SILVERS, Studley College, Warwickshire.

DELPHINE TERRELL, The University and British Dairy Institute,
Reading.

VALERIE ELISABETH WALKER, Midland Agricultural College, Sutton
Bonington.

MARGARET EDITH ANNE WATSON-BAKER, The University and British
Dairy Institute, Reading.

IVY HELEN WILLIAMS, University College of Wales, Aberystwyth.

ALISON LUCY WINFIELD, Studley College, Warwickshire.

ANDRÉE MALI YOUNG, The University and British Dairy Institute,
Reading.

EXAMINATION PAPERS OF PAST YEARS.

Copies of papers set at past Examinations in Dairying may be had on application. Price 1/- per set. Papers available are those for the years 1939-1943 inclusive.

CERTIFICATES IN FORESTRY

In 1870 the Society instituted an Examination in Forestry, and granted First and Second-Class Certificates respectively to such students as attained a certain standard of proficiency in the following subjects. Candidates were required to possess a thorough acquaintance with the theory and practice of Forestry, and a general knowledge of the following branches of study, so far as these applied to Forestry: (a) the elements of Forest Botany and Forest Zoology; (b) the elements of Meteorology and Geology; (c) Forest Engineering; and (d) Arithmetic and Book-keeping.

Holders of the First-Class Certificate were entitled to become free Life Members of the Society.

In view of the institution of Examinations for Certificates and Diplomas in Forestry by the Royal Scottish Forestry Society, and by arrangement with that Society, the Board of Directors of the Highland and Agricultural Society of Scotland resolved in 1935 to cease holding further Examinations for the First and Second-Class Certificates, and that, in future, the granting of Certificates and Diplomas be left in the hands of the Royal Scottish Forestry Society.

The list of students who obtained the Highland and Agricultural Society's Certificates in Forestry prior to 1899 appears in the 'Transactions' for the year 1899. A further list of those obtaining Certificates between 1899 and 1935 inclusive appears in the 'Transactions' for the year 1935. The total number of Certificates granted since the commencement of the Examination in 1870 was as follows: First-Class, 43; Second-Class, 38.

VETERINARY CERTIFICATES AND MEDALS

The Society established a Veterinary Department in 1823, but by an arrangement made with the Royal College of Veterinary Surgeons, the Society's examination ceased in 1881. Holders of the Society's Veterinary Certificate are entitled to become members of the Royal College of Veterinary Surgeons on payment of certain fees, without being required to undergo any further examination. The number of students who passed for the Society's Certificate is 1183.

The Society gives annually a limited number of silver medals for Class competition to each of the two Veterinary Colleges in Scotland—the Royal (Dick) Veterinary College, Edinburgh, and the Glasgow Veterinary College, Glasgow.

ENTOMOLOGICAL DEPARTMENT

Consulting Zoologist to the Society—A. E. CAMERON, M.A., D.Sc.,
Department of Agricultural and Forest Zoology, University of
Edinburgh, 10 George Square, Edinburgh.

REPORTS ON THE ANIMAL ENEMIES OF CROP PLANTS AND LIVE STOCK (INCLUDING POULTRY).

The Consulting Zoologist is prepared to send to any Member of the Society a Report on damage to, or diseases of, plants and animals due to animal agency (Insects, Mites, Worms, Snails, Slugs, Birds, and the Smaller Mammals), and will advise Members regarding insects or allied animals which, in any stage of their development, infest—

- | | |
|-----------------------------------|-------------------------------------|
| (a) Farm crops. | (d) Fruit and fruit trees. |
| (b) Stored grain and foodstuffs. | (e) Forest trees and stored timber. |
| (c) Garden and greenhouse plants. | (f) Live stock (including poultry). |

Any Member consulting Dr Cameron should give him full particulars of the damage or disease upon which his advice is desired. In addition, there should be sent to him specimens of the injured plants, or the injured parts of plants, &c., as well as specimens of the insects or animals believed to be the cause of the injury.

Specimens should be sent in tin or wooden boxes, or in quills, in order to prevent injury in transmission.

The Directors have fixed the fee payable by Members to Dr Cameron at 2s. 6d. for each case upon which he is consulted : this fee should be sent to him along with the application for information.

Letters and parcels (carriage or postage paid) should be addressed to A. E. Cameron, Esq., M.A., D.Sc., Department of Agricultural and Forest Zoology, University of Edinburgh, 10 George Square, Edinburgh.

CHEMICAL DEPARTMENT

Chemist to the Society—J. F. TOCHER, D.Sc., LL.D., F.I.C.,
Crown Mansions, 41½ Union Street, Aberdeen.

The object of the Chemical Department is to promote the diffusion of a knowledge of Chemistry as applied to agriculture among the members of the Society, to carry out experiments for that purpose, to assist members who are engaged in making local experiments requiring the direction or services of a chemist, to direct members in regard to the use of manures and feeding-stuffs, to assist them to put the purchase of these substances under proper control, and in general to consider all matters coming under the Society's notice in connection with the Chemistry of Agriculture.

MEMBERS' PRIVILEGES IN RESPECT TO ANALYSES.

The Directors are anxious to take any steps in their power to expose the vendors of inferior fertilisers and feeding-stuffs, and the members can give them assistance in this by supplying to the Chemist, when sending samples for analysis, information as to the guarantee, if any, on which the goods were sold, and also as to the price charged.

These charges apply only to analyses made for agricultural purposes, and for the sole and private use of members of the Highland and Agricultural Society who are not engaged in the manufacture or sale of the substances analysed.

Valuations of manures, according to the Society's scale of units, will be supplied if requested.

The Society will not be liable for payment of fees in respect of analyses for any member in excess of £5 for any one year, or £10 for any five consecutive years.

The undernoted fees are those payable by a member. These amounts represent only one-third of the total fee for any particular analysis, the other two-thirds being paid by the Society.

This scale does not apply to members whose subscriptions are in arrears.

FERTILISERS AND FEEDING-STUFFS.

- | | |
|---|------|
| (1) The determination of one ingredient in a single sample of a <i>manure</i> or of a <i>feeding-stuff</i> | 3/6 |
| (2) The determination of two ingredients in a single sample of a <i>manure</i> or of a <i>feeding-stuff</i> | 5/- |
| (3) The complete analysis of a sample of a <i>manure</i> or of a <i>feeding-stuff</i> | 10/- |

*For example—**For one ingredient only.*

Linseed and other cakes, for oil or for albuminoids . . .	
Feeding meals, ground cereals, for oil or for albuminoids . .	
Bone meals, for nitrogen or for total phosphate . . .	
Compound manures, for nitrogen or for soluble phosphate or for insoluble phosphate or for potash . .	
Superphosphate, for soluble phosphate or for insoluble phosphate . . .	3/6
Ground mineral phosphate, for insoluble phosphate or for citric soluble phosphate . . .	
Slag phosphate, for insoluble phosphate or for citric soluble phosphate . . .	

For two ingredients only.

Any two ingredients of a manure or of a feeding-stuff . . .	5/-
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For a complete analysis.

<i>For manures</i> , the proportions of nitrogen (nitrogen included as nitrates or as ammonia compounds), soluble phosphate, insoluble phosphate, potash ;	10/-
<i>For feeding-stuffs</i> , the proportions of oil, albuminoids, carbohydrates, iodine, mineral matter, fibre and moisture . . .	

- | | |
|---|-----|
| (4) Ground Limestone, for carbonic acid and calcium, two determinations . . . | 5/- |
| (5) Ground Lime, for percentage of calcium oxide . . . | 3/6 |

AGRICULTURAL PRODUCTS.

- | | |
|---|------|
| (6) Turnips, sugar beet, for total sugar . . . | 5/- |
| (7) Turnips, sugar beet, for oil, albuminoids, sugar, mineral matter, fibre and moisture . . . | 10/- |
| (8) Grass, hay, ensilage, grain, &c., for oil, albuminoids, carbohydrates, mineral matter, fibre and moisture . . . | 10/- |
| (9) Grain, for carbohydrates and moisture . . . | 5/- |

MILK AND MILK PRODUCTS.

- | | |
|---|-----|
| (10) <i>Milk</i> , fresh, for butter fat only, by Gerber process . . | 1/- |
| (11) <i>Milk</i> , fresh, for butter fat, by Gerber, and solids not fat . | 2/6 |
| (12) <i>Milk</i> , sour sample, for butter fat, and solids not fat. Soxhlet extraction and Government Laboratory method for sour sample . . . | 5/- |
| (13) <i>Milk</i> , for preservatives, borates, sulphur dioxide, hydrogen peroxide, formalin . . . | 5/- |
| (14) <i>Butter</i> , for true butter fat and moisture (Reichert), for genuineness . . . | 5/- |
| (15) <i>Butter</i> , for true butter fat (Reichert), moisture, foreign fat, preservatives . . . | 7/6 |

WATER AND LIQUID SUBSTANCES.

Cases containing bottles for water samples and instructions for sampling are sent from the laboratory on application.

- | | |
|--|------|
| (16) Supply of water at farm, for total solids, free ammonia, albuminoid ammonia, nitrites, nitrates, hardness, for fitness for domestic use or potability . . . | 12/6 |
| (17) Supply of water at farm, for potability as above, and for proportions of mineral constituents, lead, copper, acidity pH value, action of water on lead (plumbo solvenoy), action of water on copper . . | £1 |
| (18) Farm-yard manure, liquid manure, for nitrogen, potash, phosphates, and proportion of other mineral substances | £1 |

MISCELLANEOUS.

- | | |
|---|---------|
| (19) Feeding oils and fats, for composition and quality . . | 10/- |
| (20) Search for proportion of arsenic in feeding-stuff . . . | 10/- |
| (21) Search for proportion of lead in feeding-stuff . . . | 10/- |
| (22) Search for arsenic or any one poison in feeding-stuff . . | 10/- |
| (23) Search for proportion of any one poison in viscera . . | 10/- |
| (24) Search for poisons in food or in viscera, and proportion of poison found | £1 10/- |
- (Veterinary surgeons are not entitled to have searches made for poisons in food or viscera under the Society's scheme for clients who are not members of the Society.)*
- | | |
|--|------|
| (25) Proportion of arsenic in sheep dips or insecticides . . | 10/- |
| (26) Proportion of carbolic acid in sheep dips or insecticides . | 5/- |
| (27) Proportion of tar acids in sheep dips or insecticides . . | 10/- |
| (28) Insecticides, foot rot pastes and other agricultural remedies for live stock and farm produce | £1 |

Samples should be sent (carriage paid) to Dr J. F. TOCHER, Crown Mansions, 41½ Union Street, Aberdeen.

INSTRUCTIONS FOR SELECTING SAMPLES FOR ANALYSIS.

MANURES.

Any method of sampling mutually agreed upon between buyer and seller may be adopted, but the following method is recommended as a very complete and satisfactory one: Four or more bags should be selected for sampling. Each bag is to be emptied out separately on a clean floor, worked through with the spade, and one spadeful taken out and set aside. The four or more spadefuls thus set aside are to be mixed together until a uniform mixture is obtained. Of this mixture one spadeful is to be taken, spread on paper, and still more thoroughly mixed, any lumps which it may contain being broken down with the hand. Of this mixture two samples of about half a pound each should be taken by the purchaser or his agent, in the presence of the seller or his agent or two witnesses (due notice having been given to the seller of the time and place of sampling), and these samples should be taken as quickly as possible, and put into bottles

or tin cases to prevent loss of moisture, and having been labelled, should be sealed by the samplers—one or more samples to be retained by the purchaser, and one to be sent to the Chemist for analysis.

FEEDING-STUFFS.

Samples of feeding-stuffs which are in the form of meal may be taken in a similar manner to that mentioned above.

Samples of cake should be taken by selecting four or more cakes from the bulk. These should be nuted to a size not larger than walnuts. The nuted cake should then be thoroughly mixed and samples of not less than one pound each taken from it. The samples should be put into bottles or tins, sealed up, and labelled. One sample should be sent to the Chemist, and one or more duplicates retained by the purchaser.

VEGETABLE PRODUCTS.

Turnips, &c., at least 50 bulbs carefully selected as of fair average growth.

Hay, straw, ensilage, &c., should be sampled from a thin section cut across the whole stack or silo, and carefully mixed; above 2 lb. weight is required for analysis.

Grain should be sampled like manures.

Grass should be representative of the whole field; about 5 lb. weight is required for analysis.

DAIRY PRODUCE.

Milk.—Samples of milk from individual cows should be taken direct from the milk-pail after complete milking. Average samples from a number of cows should be taken immediately after milking. Specify whether the sample is morning or evening milk, or a mixture of these. Samples to be tested for adulteration should not be drawn from the bottom or taken from the top of standing milk, but they should be ladled from the vessel after the milk has been thoroughly mixed. Samples of milk should be sent immediately to the Chemist.

For most purposes a half-pint bottle of milk is a large enough sample.

Butter.—About quarter-pound samples are required.

WATERS.

When the water is from a well, it should be pumped for some minutes before taking the sample.

If the well has been standing unused for a long time, it should be pumped for some hours, so that the water may be renewed as far as possible.

If the well has been newly dug or cleaned out, it should be pumped as dry as possible, daily, for a week before taking the sample.

Water from cisterns, tanks, ponds, &c., should be sampled by immersing the bottle entirely under the water, and holding it, neck upwards, some inches below the surface. *Water from the surface should not be allowed to enter the bottle.*

Spring or stream water should not be sampled in very wet weather, but when the water is in ordinary condition. Such waters should be sampled by immersing the bottle. If not deep enough for that

purpose, a perfectly clean cup should be used for transferring the water to the bottle.

When the bottle has been filled the stopper should be rinsed in the water before replacing it.

Interference with or disturbance of wells or springs, or the ground in their immediate vicinity, must be carefully avoided during sampling, and for at least twenty-four hours before it.

After a sample has been taken, it should be sent to the Chemist as speedily as possible.

A description of the source and circumstances of the water should accompany the sample, as the interpretation of the analytical results depends to some extent on a knowledge of such particulars.

N.B.—Stone jars and old wine bottles are unsuitable for conveying samples. Winchester quarts chemically cleaned should be obtained from Dr J. F. TOOHER, Crown Mansions, 41½ Union Street, Aberdeen.

COMPOSITION AND CHARACTERISTICS OF MANURES AND FEEDING-STUFFS.

Note on Statutory Statements.

In the Fertilisers and Feeding Stuffs Act, 1926, are included certain schedules which give the definitions implied on the sale of fertilisers and feeding-stuffs under certain names and also the particulars to be contained in the statutory statement which has to be furnished to the purchaser in connection with the sale of a fertiliser or a feeding-stuff. Such statutory statements "shall have effect as a written warranty by the seller that the particulars contained in the statutory statement are correct."

The particulars required vary for different articles and the under-noted are given as examples. Full particulars can be found by reference to the schedules of the Act.

FERTILISERS.

Sulphate of ammonia	. . .	Amount of nitrogen and amount of free acid.
Superphosphate	. . .	Amount of soluble phosphoric acid.
Potassium salts (potash fertilisers)	. . .	Amount of potash.
Compound fertilisers	. . .	Amounts of nitrogen, potash, soluble phosphoric acid, and insoluble phosphoric acid, if any, respectively.

FEEDING-STUFFS.

Linseed cakes and the meals of such cakes.	. . .	Amounts of oil and albuminoids.
Cotton cakes or meals (not decorticated).	. . .	Amounts of oil and albuminoids.
Cotton cakes or meals from decorticated or partly decorticated cotton seed.	. . .	Amounts of oil, albuminoids, and fibre.
Compound cakes or meals	. . .	Amounts, if any, of oil, albuminoids, and fibre.

PRICES OF FERTILISERS AND FEEDING-STUFFS— SEASON 1944.

(Cash Prices as at 2nd February. These prices are subject to variation from month to month or oftener.)

FERTILISERS.

Name of Fertiliser.	Guarantee.	Price per Ton.	Price per Unit.
		£ s. d.	s. d.
Superphosphate **	18% Sol. Phos. Acid = 39.3 % Tric. Phos. }	5 8 6	6 0½
(March-June)		5 10 0	6 1½
Sulphate of Ammonia (neutral) *	20.6 % Nitrogen	10 0 6	9 8½
(March-June)		10 2 0	9 9½
Basic Slag *†	12 % Total Phos. Acid = 26.2 % Tric. Phos. }	2 12 6	4 4½
" *†	13 % Total Phos. Acid = 28.4 % Tric. Phos. }	2 15 6	4 3½
" *†	14 % Total Phos. Acid = 30.6 % Tric. Phos. }	2 18 6	4 2½
" *† (Bessemer)	18.3 % Total Phos. Acid. = 40 % Tric. Phos. }	3 12 6	3 11½
Bone Meal (Indian)	4 % Nit. 20 % Total Phos. Acid = 43.7 % Tric. Phos. }	14 0 0	N 31 1 TPA 7 9½
Chilean Nitrate of Soda *	16 % Nitrogen	10 14 0	13 4½
Chilean Potash Nitrate *	15 % " "	15 15 0	N 14 0 P 7 0
Nitro Chalk *	15.5 % Nitrogen	9 14 0	12 6½
Sulphate of Potash	48.5 % Potash	18 15 0	7 8½
Muriate of Potash	60 % " "	13 13 0	4 6½

The prices for all fertilisers are cash prices for two-ton lots in bags at Leith or Glasgow, unless otherwise stated. Where prices are quoted carriage paid, there is a reduction, in certain cases, of from 5/- to 10/- per ton when lifted Ex Sellers' stores.

** Carriage paid to any railway station in six-ton lots. Four-ton lots 2/6 more per ton.

* Carriage paid to any railway station in six-ton lots. Four-ton lots 1/- more per ton.

† The fineness is such that 80 % of the powder will pass through the prescribed sieve.

‡ The fineness is such that 90 % of the powder will pass through the prescribed sieve. 85 % solubility in citric acid.

N.B.—When these units are multiplied by the percentages in the analysis of a Manure, they will produce a value representing very nearly the cash price per ton at which Fertilisers may be bought in fine sowing condition at Leith or Glasgow.

Ground Lime, in bags (60 % calcium oxide), at Dufftown, 58/- per ton; (60 % calcium oxide), at Fushiebridge, 52/4 per ton; (70 % calcium oxide), at Cultra, 50/1 per ton.

English Ground Lime (95 % calcium oxide), at Buxton, f.o.r. 40/8 per ton, in bags; or to Edinburgh, 67/4 per ton; to Lanark, 64/10 per ton; to Stirling, 70/8 per ton; to Dumfries, 62/5 per ton; to Aberdeen, 76/7 per ton.

FEEDING-STUFFS.

Name of Feeding-Stuff.	Price per Ton.
Linseed Cake (Home), 8 % Oil, 28 % Albuminoids	£ s. d. 11 5 0
" (Expeller), 9 % Oil, 30 % Albuminoids *	11 7 6
Cotton Seed Cake (Egyptian) (uncorticated) (home made), 4.5 % Oil, 22 % Albuminoids	7 17 6
Decorticated Cotton Seed Cake, 48-50 % Oil and Albuminoids *	10 2 6
Ground Nut Cake— Decorticated (Expeller), 48-50 % Oil and Albuminoids *	9 10 0
" 57-60 % Oil and Albuminoids *	9 17 6
Palm Kernel Cake	8 5 0
Rice Bran Meal	8 5 0
White Bran, straight run	9 17 6
Red Bran, straight run	8 17 6
Dried Grains †	7 7 6
Locust Beans (Kibbled) *†	8 17 6
Maize *†	9 12 6
" (Flaked) *†	10 0 0
Home Oats (Feeding)	11 17 6
White Fish Meal, 4 % Oil, 64 % Albuminoids (at Aberdeen)	16 0 0
	23 14 8

Prices are for one-ton lots direct ex import quay or mill, unless otherwise stated.

* Controlled price. None available at this date.

† Including Bags.

‡ Bags extra.

CLASSIFICATION OF MANURES.

BONE MEALS	{ Genuine Bone Meal contains about 20 per cent Phosphoric Acid equal to 43.7 per cent Tricalcium Phosphate, and about 4 per cent Nitrogen. If Phosphates are low, Nitrogen will be high, and conversely.
MIXTURES AND COMPOUND MANURES	{ To be valued according to the following units: Nitrogen, 9/10; Soluble Phosphoric Acid, 5/8½; Insoluble Phosphoric Acid, 3/5; and Potash, 4/11 (from muriate). The value so arrived at will be the value at Leith or Glasgow, exclusive of the cost of mixing, bags and bagging, which may be taken on an average at about 30/- per ton.

INSTRUCTIONS FOR VALUING MANURES.

The unit used for the valuation of manures is the hundredth part of a ton, and as the results of analyses of manures are expressed in parts per hundred, the percentage of any ingredient of a manure when multiplied by the price of the unit of that ingredient represents the value of the quantity of it contained in a ton.

As an example take muriate of potash; a good sample (see p. 44) will be guaranteed to contain 60 per cent of oxide of potash. All potash manures are valued according to the amount of potash (oxide of potash) they yield, and muriate of potash yields 60 per cent of potash (K_2O)—i.e., 60 units per ton; and as a ton of muriate of potash costs £13, 13s., the price of the unit is the sixtieth part of that—viz., $4/6\frac{1}{2}$. If on analysis a sample of muriate of potash guaranteed to contain 60 per cent of potash is found to contain only 56 per cent, the price per ton will be $18/2$ (four times $4/6\frac{1}{2}$) less—viz., £12, 14s. 10d.

Similarly with all other manures, the price per unit is derived from the price per ton of a sample of good material up to its guarantee, and

therefore the proper price per ton of a manure is found by multiplying the price of the unit of the valuable ingredient by the percentage as found by analysis. If a manure contains more than one valuable ingredient, the unit value of each ingredient is multiplied by its percentage, and the values so found when added together give approximately the price per ton of the manure.

The commercial values of manures are determined by means of the **UNITS** in the following manner :—

Take the results of analysis of the manure, and look for the following substances :—

Phosphates dissolved (or soluble phosphoric acid)

Phosphates undissolved (or insoluble phosphoric acid)

Total phosphoric acid

Nitrogen

Potash

No other items but these are to be valued.

Should the results of analysis or the guarantee not be expressed in that way, the chemist or the seller should be asked to state the quantities in these terms.

Suppose the manure is a superphosphate. The February price per unit of phosphoric acid in superphosphate (18 per cent grade) is 6/0½, and if a consignment contains 17 per cent soluble phosphoric acid it is valued thus—

Soluble phosphoric acid. 17 times 6/0½, equal to £5, 2s. 4d.

Insoluble phosphoric acid is not valued in a superphosphate.

Suppose the manure is a compound fertiliser containing 6 per cent nitrogen, 8 per cent soluble phosphoric acid, 1 per cent insoluble phosphoric acid, and 5 per cent potash. From the units given on p. 45 for "Mixtures and Compound Manures," the value of this compound fertiliser is obtained as follows :—

The value of the—

Nitrogen will be	£2	19	0	per ton
Soluble phosphoric acid will be	2	6	4	"
Insoluble phosphoric acid will be	0	3	5	"
Potash will be	1	4	7	"

£6 13 4

The value of this manure will thus be £6, 13s. 4d. per ton, exclusive of the cost of mixing, bags and bagging, which may be taken on an average at about 30/- per ton. It will be seen that the potash is valued on the assumption that it is derived from muriate.

Notes.—The units have reference solely to the **MARKET PRICES** of **MANURES**, and not to their **AGRICULTURAL VALUES**.

TABLE OF COMPENSATION VALUES FOR 1944.

TABLE SHOWING THE VALUE OF FEEDING-STUFFS AS MANURE PER TON, AND THE COMPENSATION VALUE PER TON OF FOOD CONSUMED, BASED ON THE AVERAGE UNIT PRICES OF FERTILISERS FOR 1944.

The following is a Table showing (under Section A) the average proportions of nitrogen, phosphoric acid, and potash present in the feeding-stuffs named. The Table also shows the value per unit of nitrogen, phosphoric acid, and potash, the prices per unit being the value per unit for compound manures prevailing for 1944. Under Section B of the Table is shown the compensation value per ton of food consumed for each of the feeding-stuffs named, based on the unit prices for 1944. Column (1) of Section B of the Table shows the value per ton recovered in dung; while the remaining two columns show the residual values per ton after one crop and two crops have been removed.

The residual value, after one crop has been removed, is taken as one-half of the original residual value. Residual values, after one crop has been removed, are reduced by one-half after each crop.

Foods.	Nitrogen.			
	Per cent in food.	Value at 9s. 10d. per unit.	Two-fifths value to manure.	
	(1)	(2)	(3)	
		s. d.	s. d.	
Cotton-cake, decorticated	6.90	67 10	27 2	
Cotton-cake, undecorticated	3.54	34 10	13 11	
Linseed-cake	4.75	46 9	18 8	
Linseed	3.60	35 5	14 2	
Soya-bean cake	6.85	67 4	26 11	
Palm-nut cake	2.50	24 7	9 10	
Cocoa-nut cake	3.40	33 5	13 4	
Earth-nut cake	7.62	74 11	30 0	
Rape cake	4.60	48 2	19 3	
Beans	4.00	39 4	15 9	
Peas	3.60	35 5	14 2	
Wheat	1.80	17 8	7 1	
Barley	1.65	16 3	6 6	
Oats	2.00	19 8	7 10	
Maize	1.70	16 9	6 8	
Rice-meal	1.90	18 8	7 6	
Locust beans	1.20	11 10	4 9	
Malt	1.70	16 9	6 8	
Malt culms	3.90	38 4	15 4	
Bran	2.50	24 7	9 10	
Brewers' and distillers' grains (dried)	3.30	32 5	13 0	
Brewers' and distillers' grains (wet)	0.81	8 0	3 2	
Dried distillery dreg	5.31	52 3	20 11	
Clover hay	2.24	22 0	8 10	
Meadow hay	1.50	14 9	5 11	
Wheat straw	0.45	4 5	1 9	
Barley straw	0.40	3 11	1 7	
Oat straw	0.50	4 11	2 0	
Mangolds	0.22	2 2	0 10	
Swedes	0.25	2 6	1 0	
Turnips	0.18	1 9	0 8	
Fish-meal	8.98	88 4	35 4	

The figures in column (10) are the

A.						B.					
VALUE PER TON AS MANURE.						COMPENSATION VALUE PER TON OF FOOD CONSUMED.					
Phosphoric Acid.			Potash.			(1) Value re- covered in dung	Residual Value after				
Per cent in food (4)	Value at 5s. 9d per unit. (5)	Three- fourths value to manure. (6)	Per cent in food. (7)	Value at 4s. 11d. per unit. (8)	Three- fourths value to manure (9)		(2) One crop. (11)	(3) Two crops. (12)			
	s. d.	s. d.		s. d.	s. d.		s. d.	s. d.			
3.10	17 10	13 5	2.00	9 10	7 5	48 0	24 0	12 0			
2.00	11 6	8 8	2.00	9 10	7 5	30 0	15 0	7 6			
2.00	11 6	8 8	1.40	6 11	5 2	32 6	16 3	8 2			
1.54	8 10	6 8	1.37	6 9	5 1	25 11	13 0	6 6			
1.30	7 6	5 8	2.20	10 10	8 2	40 9	20 5	10 2			
1.20	6 11	5 2	0.50	2 6	1 11	16 11	8 6	4 3			
1.40	8 1	6 1	2.00	9 10	7 5	26 10	13 5	6 9			
2.00	11 6	8 8	1.50	7 5	5 7	44 3	22 2	11 1			
2.50	14 5	10 10	1.50	7 5	5 7	35 8	17 10	8 11			
1.10	6 4	4 9	1.30	6 5	4 10	25 4	12 8	6 4			
0.85	4 11	3 8	0.96	4 9	3 7	21 5	10 9	5 4			
0.85	4 11	3 8	0.53	2 7	1 11	12 8	6 4	3 2			
0.75	4 4	3 3	0.55	2 8	2 0	11 9	5 11	2 11			
0.60	3 5	2 7	0.50	2 6	1 11	12 4	6 2	3 1			
0.60	3 5	2 7	0.37	1 10	1 5	10 8	5 4	2 8			
0.60	3 5	2 7	0.37	1 10	1 5	11 6	5 9	2 11			
0.80	4 7	3 5	0.80	3 11	2 11	11 1	5 7	2 9			
0.80	4 7	3 5	0.60	2 11	2 2	12 3	6 2	3 1			
2.00	11 6	8 8	2.00	9 10	7 5	31 5	15 9	7 10			
2.70	15 6	11 8	1.45	7 2	5 5	26 11	13 6	6 9			
1.61	9 3	6 11	0.20	1 0	0 9	20 8	10 4	5 2			
0.42	2 5	1 10	0.05	0 3	0 2	5 2	2 7	1 4			
0.44	2 6	1 11	0.22	1 1	0 10	23 8	11 10	5 11			
0.57	3 3	2 5	1.50	7 5	5 7	16 10	8 5	4 3			
0.40	2 4	1 9	1.60	7 10	5 11	13 7	6 10	3 5			
0.24	1 5	1 1	0.80	3 11	2 11	5 9	2 11	1 5			
0.18	1 0	0 9	1.00	4 11	3 8	6 0	3 0	1 6			
0.24	1 5	1 1	1.00	4 11	3 8	6 9	3 5	1 8			
0.07	0 5	0 4	0.40	2 0	1 6	2 8	1 4	0 8			
0.06	0 4	0 3	0.22	1 1	0 10	2 1	1 1	0 6			
0.05	0 3	0 2	0.30	1 6	1 2	2 0	1 0	0 6			
7.24	41 8	31 3	0.50	2 6	1 11	68 6	34 3	17 2			

sum of columns (3), (6), and (9).

BOTANICAL DEPARTMENT

Consulting Botanist to the Society—(vacant).

The Society has fixed the following scale of charges for the examination of plants and seeds for the *bona fide* and individual use and information of members of the Society (not being seedsmen), who are particularly requested, when applying to the Consulting Botanist, to mention the kind of examination required, and to quote its number as appearing in the under voted Scale of Charges. The charge for examination must be paid at the time of application, and the carriage or postage on all parcels must be prepaid.

Scale of Charges for Examinations.

1. A report on the purity, amount, and nature of foreign materials, and the germinating power of a sample of seed 1s.
2. Determination of the species of any weed or other plant, or of any vegetable parasite, with a report on its habits and the means for its extermination or prevention 1s.
3. Report on any disease affecting farm crops 1s.
4. Determination of the species of any natural grass or fodder plant, with a report on its habits and pasture or feeding value 1s.

The Consulting Botanist's Reports are furnished to enable members—purchasers of seeds and corn for agricultural or horticultural purposes—to test the value of what they buy, and are not to be used or made available for advertising or trade purposes by seedsmen or otherwise.

Purchase of Seeds.

The purchaser should obtain from the vendor, by invoice or other writing, the proper designation of the seeds bought, with a guarantee of the percentage of purity and germination, and of its freedom from ergot, and in the case of clover, from the seeds of dodder or broomrape.

It is strongly recommended that the purchase of *prepared mixtures* of seeds should be avoided. The different seeds should be purchased separately and mixed by the farmer: mixtures cannot be tested for germination.

The Sampling of Seeds.

The utmost care should be taken to secure a fair and honest sample. This should be drawn from the bulk delivered to the purchaser, and not from the sample sent by the vendor.

When legal evidence is required, the sample should be taken from the bulk, and placed in a sealed bag in the presence of a witness. Care should be taken that the sample and bulk be not tampered with after delivery, or mixed or brought in contact with any other sample or bulk.

At least one ounce of grass and other small seeds should be sent, and two ounces of cereals and the larger seeds. When the bulk is obviously impure the sample should be at least double the amount specified. Grass seeds should be sent at least four weeks, and seeds of clover and cereals two weeks, before they are to be used.

The exact name under which the sample has been sold and purchased should accompany it.

Reporting the Results.

The Report will be made on a schedule in which the nature and amount of impurities will be stated, and the number of days each sample has been under test, with the percentage of the seeds which have germinated.

"Hard" clover seeds, though not germinating within the time stated, will be considered good seeds, and their percentage separately stated.

The impurities in the sample, including the chaff of the species tested, will be specified in the schedule, and only the percentage of the pure seed of that species will be reported upon; but the REAL VALUE of the sample will be stated. The Real Value is the combined percentages of purity and germination, and is obtained by multiplying these percentages and dividing by 100: thus in a sample of Meadow Fescue having 88 per cent purity and 95 per cent germination, 88 multiplied by 95 gives 8360, and this divided by 100 gives 83.6, the Real Value.

Selecting Specimens of Plants.

The whole plant should be taken up and the earth shaken from the roots. If possible the plants should be in flower or fruit. They must be packed in a light box, or in a firm paper parcel.

Specimens of diseased plants or of parasites should be forwarded as fresh as possible. They must be placed in a bottle, or packed in tinfoil or oil-silk.

All specimens should be accompanied with a letter specifying the nature of the information required, and stating any local circumstances (soil, situation, &c.) which, in the opinion of the sender, would be likely to throw light on the inquiry.

NOTE.—Members are reminded that Seeds may now be tested at the Department of Agriculture for Scotland Seed-testing Station. Samples should be addressed to T. Anderson, Esq., Seed-testing Station, East Craigs, Corstorphine, Edinburgh.

PREMIUMS OFFERED

1944

GROUP I.—REPORTS.

GENERAL REGULATIONS.

1. It is to be distinctly understood that the Society is not responsible for the views, statements, or opinions of any of the writers whose papers are published in the 'Transactions.'

2. All reports must be legibly written, and on one side of the paper only; they must specify the number and subject of the Premium for which they are in competition; they must bear a distinguishing motto, and be accompanied by a sealed letter, similarly marked, containing the name and address of the reporter—initials must not be used.

3. No sealed letter, unless belonging to a report found entitled to the Premium offered, or a portion of it, will be opened without the author's consent.

4. Reports for which a Premium, or a portion of a Premium, has been awarded, become the property of the Society, and cannot be published in whole or in part, or circulated in any manner, without the consent of the Directors. All other papers will be returned to the authors if applied for within twelve months.

5. The Society is not bound to award the whole or any part of a Premium.

6. All reports must be of a practical character, containing the results of the writer's own observation or experiment, and the special conditions attached to each Premium must be strictly fulfilled. General essays, and papers compiled from books, will not be rewarded or accepted. Weights and measurements must be indicated by the imperial standards.

7. The Directors, before or after awarding a Premium, shall have power to require the writer of any report to verify the statements made in it.

8. The decisions of the Board of Directors are final and conclusive as to all matters relating to Premiums, whether for Reports or at General or District Shows; and it shall not be competent to raise any question or appeal touching such decisions before any other tribunal.

9. The Directors will welcome papers from any Contributor on any suitable subject, whether included in the Premium List or not ; and if the topic and the treatment of it are both approved, the writer may be remunerated and his paper published.

SECTION 1.—THE SCIENCE AND PRACTICE OF AGRICULTURE.

FOR APPROVED REPORTS.

1. On any useful practice in Rural Economy adopted in other countries, and susceptible of being introduced with advantage into Scotland—The Gold Medal. To be lodged by 1st November in any year.

The purpose chiefly contemplated by the offer of this premium is to induce travellers to notice and record such particular practices as may seem calculated to benefit Scotland. The Report to be founded on personal observation.

2. Approved Reports on other suitable subjects. To be lodged by 1st November in any year.

SECTION 2.—ESTATE IMPROVEMENTS.

FOR APPROVED REPORTS.

1. By the Proprietor in Scotland who shall have executed the most judicious, successful, and extensive Improvement—The Gold Medal, or Ten Pounds. To be lodged by 1st November in any year.

Should the successful Report be written for the Proprietor by his resident factor or farm manager, a Minor Gold Medal will be awarded to the writer in addition to the Gold Medal to the Proprietor.

The merits of the Report will not be determined so much by the mere extent of the improvements, as by their character and relation to the size of the property. The improvements may comprise reclaiming, draining, enclosing, planting, road-making, building, and all other operations proper to landed estates. The period within which the operations may have been conducted is not limited, except that it must not exceed the term of the Reporter's proprietorship.

2. By the Proprietor or Tenant in Scotland who shall have reclaimed within the ten preceding years not less than forty

acres of Waste Land—The Gold Medal, or Ten Pounds. To be lodged by 1st November in any year.

3. By the Tenant in Scotland who shall have reclaimed within the ten preceding years not less than twenty acres of Waste Land—The Gold Medal, or Ten Pounds. To be lodged by 1st November in any year.

4. By the Tenant in Scotland who shall have reclaimed not less than ten acres within a similar period—The Medium Gold Medal, or Five Pounds. To be lodged by 1st November in any year.

The Reports in competition for Nos. 2, 3, and 4 may comprehend such general observations on the improvement of waste lands as the writer's experience may lead him to make, but must refer especially to the lands reclaimed—to the nature of the soil—the previous state and probable value of the subject—the obstacles opposed to its improvement—the details of the various operations—the mode of cultivation adopted—and the produce and value of the crops produced. As the required extent cannot be made up of different patches of land, the improvement must have relation to one subject; it must be of profitable character, and a rotation of crops must have been concluded before the date of the Report. *A detailed statement of the expenditure and return and a certified measurement of the ground are requisite.*

5. By the Proprietor or Tenant in Scotland who shall have improved within the ten preceding years the Pasturage of not less than thirty acres, by means of top-dressing, draining, or otherwise, without tillage, in situations where tillage may be inexpedient—The Gold Medal, or Ten pounds. To be lodged by 1st November in any year.

6. By the Tenant in Scotland who shall have improved not less than ten acres within a similar period—The Minor Gold Medal. To be lodged by 1st November in any year.

Reports in competition for Nos. 5 and 6 must state the particular mode of management adopted, the substances applied, the elevation and nature of the soil, its previous natural products, and the changes produced.

SECTION 3.—HIGHLAND INDUSTRIES.

FOR APPROVED REPORTS.

1. The best mode of treating native Wool; cleaning, carding, dyeing, spinning, knitting, and weaving by hand in the Highlands and Islands of Scotland—Five Pounds. To be lodged by 1st November in any year.

SECTION 4.—MACHINERY.

FOR APPROVED REPORTS.

To be lodged by 1st November in any year.

SECTION 5.—FORESTRY.

FOR APPROVED REPORTS.

1. On Plantations of not less than eight years' standing formed on deep peat-bog—The Medium Gold Medal, or Five Pounds. To be lodged by 1st November in any year.

The Premium is strictly applicable to deep peat or flow moss; the condition of the moss previous to planting, as well as at the date of the Report, should, if possible, be stated.

The Report must describe the mode and extent of the drainage, and the effect it has had in subsiding the moss—the trenching, levelling, or other preliminary operations that may have been performed on the surface—the mode of planting—kinds, sizes, and number of trees planted per acre—and their relative progress and value, as compared with plantations of a similar age and description grown on other soils in the vicinity.

GROUP II.—DISTRICT GRANTS.

APPLICATIONS.

Forms of Application may be obtained from the Secretary, 8 Eglinton Crescent, Edinburgh 12, which should be completed and returned on or before **1st November 1944**, in respect of a Grant commencing in the following year.

RENEWAL OF GRANT.—Applications for **renewal** of a particular Grant will be entertained only after the lapse of a specified interval of years (as undernoted) from the termination of the previous Grant, without prejudice, however, to the competency of applying in such intermediate years for a Grant in any other class.

Class.	Interval.
*1. Grants of £12 for Show Premiums for Horses, Cattle, Sheep, and Pigs	4 years.
2. Grants of £15 in respect of Stallions engaged for Agricultural purposes	3 years.
*3. Grants of Silver Medals in aid of Premiums	2 years.
4. Special Grants	—
5. Grants of £10 to Federations of S.W.R.I. for Show or Exhibition Prizes	2 years.

* NOTE.—Grants under Classes 1 and 3 have been suspended for the duration of the War.

CLASS 1.

LOCAL AGRICULTURAL SOCIETIES—GRANTS OF £12 FOR SHOW PREMIUMS FOR HORSES, CATTLE, SHEEP, AND PIGS.

REGULATIONS.—See Volume for 1940 for Regulations and Rules of Competition.

GRANTS SUSPENDED THROUGHOUT THE WAR.—In January 1941 the Directors agreed that it was undesirable for the Society to encourage the holding of Agricultural Shows during the War, and it was decided, accordingly, that all grants by the Society of money and medals in aid of Local Agricultural Shows be suspended throughout the further duration of the War.

The Societies entitled to grants at the end of the War on resumption of their Shows are detailed in the Volume for 1941.

CLASS 2.

HORSE ASSOCIATIONS — GRANTS OF £15 IN RESPECT OF STALLIONS ENGAGED FOR AGRICULTURAL PURPOSES.

REGULATIONS, 1944.

1. The Highland and Agricultural Society will make Grants to Horse Associations and other Societies in different districts engaging Stallions for agricultural purposes. The total sum expended by the Highland and Agricultural Society in such grants shall not exceed the sum of £210 in any one year.

(*Note.*—As a special provision this sum has been raised to £300 for the year 1944.)

2. All applications must be at the instance of a Horse Association. Either the Convener or the Secretary must be a member of the Highland and Agricultural Society of Scotland.

3. *Application of Grant.*—The portion of the Grant to any one Association or Society shall not exceed the sum of £15 in any one year. **It is intended that the Grant shall be used by the Association or Society for the purpose of enabling it to secure a better class of Stallion.**

4. *Duration of Grant.*—The Grant will continue for three consecutive years.

5. *Registration of Stallions.*—The Grants will be available only for Stallions which, for the years to which the Grants apply, are registered in the Register of Certified Draught Stallions published by the Department of Agriculture for Scotland. (For information regarding the Registration of Stallions, apply to the Secretary of the Department of Agriculture for Scotland, St Andrew's House, Edinburgh.)

6. *Engagement of Stallions.*—In the event of a Horse not being engaged in any one year while the provisions of the Grant are in force, the Grant made by the Highland and Agricultural Society will cease.

7. *Report to be Submitted.*—Forms of Report will be furnished to the Secretaries. Full details, as required, must be given and the completed Reports, duly signed and certified, must be lodged with the Secretary of the Highland and Agricultural Society as soon as possible, and in no case later than **1st November**. These Reports are subject to the approval of the Directors of the Highland and Agricultural Society, against whose decision there shall be no appeal. **The grant will lapse if no Report is lodged by the due date.**

8. *Payment of Grant.*—Grants will be paid in December after the Reports have been received and found to be in order and passed by the Board of Directors.

9. *Renewal of Grant.*—An Association or Society which has received a Grant shall not be eligible to apply for a renewal of the Grant until after the expiry of three years from the termination of the previous Grant. In disposing of applications the Directors of the Highland and Agricultural Society of Scotland shall keep in view the length of interval that has elapsed since making a previous Grant, giving priority to those Associations or Societies which have been longest without a Grant.

Grants in 1944.

3rd and Final Year—GRANT OF £15.

1. BIGGAR AND PEEBLES CLYDESDALE HORSE - BREEDING ASSOCIATION.

Convener—Thomas Smith, Yett Farm, Carnwath, Lanark.

Secretary—James Noble, Gowanlea, Symington, Biggar, Lanarkshire.

Granted 1942.

2. MID ARGYLL AGRICULTURAL SOCIETY.

Convener—R. A. M. Cadzow, Ormsary, Lochgilphead, Argyll.

Secretary—Major J. G. Mathieson, Ri-Cruin, Kilmartin, Lochgilphead, Argyll.

Granted 1942.

2nd Year—GRANT of £15.

3. BRECHIN AND DISTRICT HORSE-BREEDING SOCIETY.

Convener—Andrew N. Guild, Grosefield, Brechin.

Secretary—Frederick A. Ferguson, Solicitor, Brechin.

Granted 1943.

4. DUMFRIES AND DISTRICT HORSE-BREEDING ASSOCIATION.

Convener—R. Dalziel, Rue, Auldgirth.

Secretary—William J. Will, B.Sc., &c., Acrehead, Dumfries.

Granted 1943.

5. DUNBLANE, DOYNE, AND CALLANDER HORSE - BREEDING SOCIETY.

Convener—R. W. Fairweather, Estates Office, Blair Drummond, by Stirling.

Secretary—G. Kerr Petrie, Mansfield, Doune.

Granted 1943.

6. ROSS OF MULL HEAVY HORSE-BREEDING SOCIETY.

Convener—Donald MacDonald, Sheepknowe, Bunessan, Isle of Mull.

Secretary—W. R. MacDougall, Uisgean, Bunessan, Isle of Mull.

Granted 1943.

7. SLAMANNAN DISTRICT AGRICULTURAL SOCIETY.
Convener—David Dalgleish, Seafeld, Falkirk.
Secretary—Angus A. M'Lean, Duart, Slamannan.
Granted 1943.

1st Year—GRANT of £15.

8. SCOTTISH CENTRAL HORSE-BREEDING ASSOCIATION.
Convener—.....
Secretary—Mrs M'Lay, Dunvegan, Causewayhead, Stirling.
Granted 1944.

CLASS 3.

LOCAL AGRICULTURAL SOCIETIES—GRANTS OF SILVER MEDALS IN AID OF PREMIUMS.

REGULATIONS.—See Volume for 1940 for Regulations and Rules of Competition.

GRANTS SUSPENDED THROUGHOUT THE WAR.—In January 1941 the Directors agreed that it was undesirable for the Society to encourage the holding of Agricultural Shows during the War, and it was decided, accordingly, that all grants by the Society of money and medals in aid of Local Agricultural Shows be suspended throughout the further duration of the War.

The Societies entitled to grants at the end of the War on resumption of their Shows are detailed in the Volume for 1941.

CLASS 4.

SPECIAL GRANTS—1944.

(1) ANNUAL.

1. NORTHERN COUNTIES ARTS AND CRAFTS SOCIETY—£20.
Convener—Miss Mackintosh of Raigmore, Raigmore, Inverness.
Joint-Secretary—Mrs Mitford, Berryfield, Lentrane, Inverness.
Granted 1922.
2. SCOTTISH NATIONAL UNION OF ALLOTMENT HOLDERS.
£15 and 15 Medium Silver Medals to be offered as Prizes for best Allotments.
Secretary and Treasurer—Miss H. Thompson, 28 Stafford Street, Edinburgh.
Granted 1927.

GRANTS SUSPENDED.

Various grants have been suspended for the further duration of the War (see reference under Class 1). The Societies, &c., entitled to grants at the end of the War, on resumption of their Shows or Competitions, are detailed in the Volume for 1941.

CLASS 5.

FEDERATIONS OF SCOTTISH WOMEN'S RURAL
INSTITUTES—GRANTS OF £10.

REGULATIONS, 1944.

1. The Highland and Agricultural Society of Scotland will provide annually a sum not exceeding £150 as special Grants to Federations of Scottish Women's Rural Institutes.

2. *Grant to Federation*, £10.—The amount of the Grant to any one Federation shall not exceed the sum of £10 per annum.

3. *Duration of Grant*.—The Grant will continue for two consecutive years.

4. *Disposal of Applications*.—In disposing of applications for Grants, the Directors of the Highland and Agricultural Society shall keep in view the length of interval that has elapsed since the expiration of the last Grant, giving priority to those Federations which have been longest off the list.

5. *Eligibility to Apply*.—All applications must be at the instance of a properly constituted Federation of Institutes.

6. *Application of Grant*.—The Grant of £10 shall not be applied as a Grant-in-aid to the general funds of a Federation, but must be offered in the form of Prizes at any Show or Competition held under the auspices of the Federation.

7. *Announcement of Grant*.—The offer of Prizes must be announced in the Prize List or Catalogue of the Show or Competition as "presented by the Highland and Agricultural Society of Scotland," or the amount of the Grant must be shown as a separate item of donation in the published statement of Accounts.

8. *Rules of Competition*.—The Rules of Competition for the Prizes, the funds for which are derived from Grants of the Highland and Agricultural Society of Scotland, shall be such as are generally enforced in the case of Prizes offered from the Federation's own funds.

9. *Report to be Submitted*.—Forms of Report will be furnished to the Secretaries of Federations, and these must be completed and returned to the Society as soon as possible after the Show or Competition and in no case later than 1st November. These Reports are subject to the approval of the Directors of the Highland and Agricultural Society, against whose decision there shall be no appeal. All Reports must be signed and certified as marked on the Form.

The Grant will lapse if no Report is lodged.

10. *Payment of Grant.*—Payment of the Grant will be made in December after the Reports of the Awards have been received and found to be in order and passed by the Board of Directors.

11. *Renewal of Grant.*—A Federation which has received a Grant for two consecutive years shall not be eligible to apply for a renewal of the Grant until after the expiry of two years from the termination of the previous Grant.

Grants in 1944.

2nd Year.

1. DUMFRIESSHIRE FEDERATION.

Convener—Mrs Graham, Mossknowe, Kirkpatrick-Fleming.

Secretary—Mrs Forrester, Kilness, Dumfries.

Granted 1939. (Grants in abeyance 1940, 1941, 1942, 1943.)

2. EAST LOTHIAN FEDERATION.

Convener—Mrs Hay, Belton, Dunbar.

Secretary—Mrs M'Kemmie, 2 Wemyss Place, Haddington.

Granted 1938. (Grants in abeyance 1938, 1940, 1941, 1942, 1943.)

3. MIDLOTHIAN FEDERATION.

Convener—Mrs Mercer, Southfield, Dalkeith.

Secretary—Miss N. Scott Muir, 10 Silverknowes Loan, Davidson's Mains, Edinburgh 4.

Granted 1940. (Grants in abeyance 1940, 1941, 1943.)

4. MULL, ISLE OF, FEDERATION.

Convener—Mrs Allan of Aros, Tobermory.

Secretary—Mrs Cuninghame, Linnthu, Tobermory.

Granted 1939. (Grants in abeyance 1940, 1941, 1942, 1943.)

5. ROSS-SHIRE FEDERATION.

Convener—Mrs Ross, East House, Portmahomack, Ross-shire.

Secretary—Miss Margaret Rose, Inchrorie, Strathpeffer.

Granted 1939. (Grants in abeyance 1940, 1941, 1942, 1943.)

6. STEWARTRY OF KIRKCUDBRIGHT FEDERATION.

Convener—Mrs Jaffe, Netherhall, Castle-Douglas.

Secretary—Miss A. R. Parker, Balmakethe, Castle-Douglas.

Granted 1940. (Grant in abeyance 1940, 1942, 1943.)

GROUP III.—COTTAGES AND GARDENS, &c.**CLASS 6.**

**LOCAL SOCIETIES, &c.—GRANTS FOR BEST-KEPT
COTTAGES AND GARDENS.**

CLASS 7.

**LOCAL SOCIETIES, &c.—GRANTS OF MINOR SILVER
MEDALS FOR BEST-KEPT COTTAGES AND GARDENS,
GARDEN PRODUCE, POULTRY, AND HONEY.**

REGULATIONS.—See Volume for 1941 for Regulations and Rules of Competition.

GRANTS.—None of the Societies listed in 1941 held a Competition in that year. In the event of any Society holding a Competition in 1944, the respective grants will be made available, as detailed in the Volume for 1941.

GROUP IV.—PLOUGHING, HOEING, AND LONG FARM SERVICE.

1. MEDALS FOR PLOUGHING COMPETITIONS.

The Ploughing Medal will be given to the winner of the first Premium at Ploughing Competitions, provided a Report in the following terms on the official form is made to the Secretary, within one month of the Competition, by a Member of the Society. Forms of Report to be had on application.

NOTE. *Tractor Ploughing Competitions.*—These Competitions referred originally to Horse Ploughing Matches. As from 1944 the Medals also became available for Tractor Ploughing Competitions, to which Rules 1-7 shall apply.

FORM OF REPORT.

I, _____ of _____, Member of the Highland and Agricultural Society, hereby certify that I attended the Ploughing Match of the _____ Association at _____ in the county of _____ on the _____ when _____ ploughs competed; _____ of land were assigned to each, and _____ hours were allowed for the execution of the work. The sum of £ _____ was awarded as follows:—

[Here enumerate the names and designations of successful Competitors.]

RULES OF COMPETITION.

1. All Matches must be at the instance of a Local Society or Ploughing Association, and no Match at the instance of an individual, or confined to the tenants of one estate, will be recognised.

2. The title of such Society or Association, together with the name and address of its Secretary, must be registered with the Secretary of the Highland and Agricultural Society of Scotland, 8 Eglinton Crescent, Edinburgh.

3. Not more than one Match in the same season can take place within the bounds of the same Society or Association.

4. All reports must be lodged within one month of the date of the Match, and certified by a Member of the Highland and Agricultural Society who was present at it.

5. A Member can report only one Match; and a Ploughman cannot carry more than three Medals in the same season.

6. To warrant the grant of the Medal, there must have been 12 Ploughs in actual competition for the medal (*i.e., in the particular class for which the medal was offered*) and not less than £3 awarded in Prizes by the Local Society. The Medal to be given to the winner of the first prize.

7. The Local Society or Ploughing Association shall decide what class of ploughs shall compete for the Medal, and if so agreed, may offer it for competition to the class of plough most generally in use in the district.

8. The Local Society or Committee may, if they desire, arrange to let each Ploughman have one person to guide the horses for the first two and the last two furrows, but in no case shall Ploughmen receive any other assistance, and their work must not be set up or touched by others. Attention should be given to the firmness and sufficiency of the work below, more than to its neatness above the surface.

9. The Local Committee is required to fix the time to be allowed for ploughing the portion of land, and they are recommended that the time be at the rate of not more than fourteen hours per imperial acre on light land, and eighteen hours on heavy or stony land.

NOTE.—The attention of the Directors of the Society has frequently been drawn to certain irregularities which have occurred in connection with the conduct of Ploughing Matches and the completion of the Reports thereon. Complaints have been made (a) that the allotted amount of ground has not been ploughed, within the specified time, by the competitor awarded the first prize; (b) that the Report sent to this Society has been signed by a Member of the Society who was not present at the Match. It has to be pointed out that any infringement of the above Rules by a Local Society or Ploughing Association will render that Society or Association liable, at the discretion of the Board of Directors, to be debarred from receiving the Society's Medals.

2. MEDALS FOR HOEING COMPETITIONS.

The Minor Silver Medal will be given to the winner of the first Premium at Hoeing Competitions, provided a Report on the official form is made to the Secretary within a month of the Competition by a Member of the Society. Forms of Report to be had on application.

RULES OF COMPETITION.

1. All Matches must be at the instance of a Local Society or Hoeing Association, and no Match at the instance of an individual, or confined to the tenants of one estate, will be recognised.

2. The title of such Society or Association, together with the name and address of its Secretary, must be registered with the Secretary of the Highland and Agricultural Society of Scotland, 8 Eglinton Crescent, Edinburgh.

3. Not more than one Match in the same season can take place within the bounds of the same Society or Association.

4. All reports must be lodged within one month of the date of the Match, and certified by a Member of the Highland and Agricultural Society who was present at it.

5. A Member can only report one Match; and same Competitor cannot carry more than three Medals in the same season.

6. To warrant the grant of the Medal there must have been twelve hoes in Competition, and not less than Three Pounds awarded in prizes by the Local Society or Association. The Medal to be given to the winner of the first prize.

7. The time to be allowed to be decided by the local Committee, but in no case to exceed two hours for two drills of 100 yards each, the third drill being unoccupied, so that Competitors do not interfere with their neighbour's work.

8. Competitors must finish their work as they go along—no turning back or after-dressing allowed. Hand-picking or transplanting shall be strictly prohibited.

9. A Committee shall be appointed to watch the work, and any Competitor found transplanting or otherwise not complying with the Rules shall have his number withdrawn, and be debarred from receiving any prize which might otherwise have been awarded to him.

NOTE.—Medals will be awarded under similar conditions for Competitions in hand-singling.

3. CERTIFICATES AND MEDALS FOR LONG FARM SERVICE.

Certificates and Silver Medals for long service will be awarded by the Society to farm servants, male or female, having an approved service in Scotland of not less than thirty years (not necessarily continuous) —(a) with one employer on the same or different holdings ; (b) on the same holding with different employers.

Special Certificates and Gold Medals are also awarded to farm servants, male or female, having an approved service in Scotland of not less than forty-five years (not necessarily continuous), on similar conditions of employment as the above. (*Note.*—The issue of Gold Medals has been temporarily suspended for the further duration of the War.)

Forms of Application are obtainable from the Secretary, 8 Eglinton Crescent, Edinburgh.

War Service to count towards the time required for qualification, where farm servants have returned to same service or employment with same farmer or his family.

The award is strictly confined to **Farm** workers, such as Ploughmen, Cattlemen, and Shepherds.

Domestic and House Servants and Estate workers, such as Foresters, Carters, Grooms, &c., are not eligible.

Awards in 1943.

The following received the Special Certificate (Gold Medal temporarily suspended) for service of forty-five years and over :—

Cameron, Allan, 2 Ardery, Strontian.

Paterson, William, Kirkchrist, Kirkcudbright.

The following received the Silver Medal and Certificate for service of from thirty to forty-four years :—

Brown, Thomas A., Blythe, Lauder.

Cameron, Donald, Caim Cottage, Salen.

Dalglish, Robert, West Middles, Lilliesleaf.

Dickson, Francis, Larriston, Newcastleton.

Douglas, Walter, Muirhouse, Stow.

Geddes, James, Newmill of Balgavies, Forfar.

Gillies, Alexander, Coultoon, Port Charlotte.
Greggan, John, Balmangan, Kirkcudbright.
Hunter, James R., Ballindarg, Forfar.
Hutchison, Annie F., Kirkoswald, Maybole.
Lothian, David F., Blythe, Lauder.
M'Culloch, William, 13 Main Road, Whitletts, Ayr.
M'Kenzie, William, Murrayshall, Cambusbarron.
M'Millan, Dugald, Garvalt, Glenbarr, Tarbert.
M'Quat, Edward, Eastertoun, Stow.
Murray, Nancy, 3 The Yard, Linstock, Carlisle.
Oliver, Thomas, Calton, Cumnock.
Patterson, Peter, Faughhill, Melrose.
Riddell, Alexander, Falahill, Heriot.
Ross, John, Milleraig, Alness.
Scott, John F., Bowerhouse, Lauder.

MEMBERS ADMITTED SINCE THE LIST WAS PUBLISHED IN APRIL 1943.

ARRANGED ACCORDING TO SHOW DISTRICTS.

(ELECTED 3RD JUNE 1943 AND 6TH JANUARY 1944.)

1.—GLASGOW DIVISION

ARGYLL

Admitted
1944 Brown, A. Hargreaves, of Ardlussa,
Isle of Jura

AYR

1944 Kerr, David, Newhouse Farm, Kilbirnie
1944 Logan, Hugh A., Meikle Mossie, Kil-
marnock
1944 Logan, James, Meikle Mossie, Kil-
marnock
1948 Thom, Charles L., B.Sc., The Hannah
Dairy Research Institute, Kirkhill,
Ayr

LANARK

1943 Ireland, William (Fleming & Co.),
31 Robertson Street, Glasgow
1944 Kirkwood, R. D. B., 6 Cunninghame
Road, East Kilbride
1943 Slater, John (Fleming & Co.), 31 Robert-
son Street, Glasgow
1943 Stevenson, A. K., Secretary, Royal
Scottish Automobile Club, Blyths-
wood Square, Glasgow

RENFREW

1943 Donald, George Graham, 22 Hamilton
Avenue, Pollokshields, Glasgow

2.—PERTH DIVISION

ANGUS

1944 Cantlay, William John, B.Sc. (Agric.),
13 Charles Street, Forfar
1944 Dunn, Robert, Muirhouses of Airlie, by
Kirklemuir
1944 Murdie, T. Lawrie, Baggerton, Forfar

FIFE

1943 Clark, Alexander William, Strathore
House, Thornton
1943 Howie, John, Newton, Wormit
1944 Inglis, Thomas Fleming, Dalachy Farm,
Aberdour

1943 Leadbetter, Archibald Scotland, Leden
Urquhart, Gateside
1943 M'Clung, S., Balquhomery, Leslie
1943 M'Lulich, Donald, Craighead, Crail
1943 Melville, Harry W., Balmullo House,
Leuchars
1944 Morison, W. Walker, Falfield, Cupar
1943 Samson, Charles F., Downfield, Lady-
bank
1943 Spence, Robert A., Dunbog, Newburgh

PERTH

1944 M'Intosh, William Whitehead, William-
ston, Madderty, Crieff

3.—STIRLING DIVISION

PERTH

(STIRLING SHOW DISTRICT)

1944 Somerville, Charles William, Inverard-
ran, Crianlarich

STIRLING

1944 Clark, Miss Mairi D., Rougheraig,
Lennoxtown
1944 Gordon, Leslie C., Redding Road, Pol-
mont

1944 Hunter, Alexander, Brightons, Polmont
1944 Jones, J. C. Bruce, Glenbervie, Larbert
1944 MacNaughton, Ronald Reginald, V.S.,
5 Victoria Place, Stirling
1943 Millar, John M., Prospecthill, Falkirk
1943 Millar, Miss Margaret, Prospecthill,
Falkirk
1943 Millar, Robert M., 2 Oswald Street,
Falkirk
1943 Miller, William D., "Viewforth," Airth
1944 Paterson, George, Springkerse, Stirling
1944 Spark, James G., 29 Burnhead Road,
Larbert

4.—EDINBURGH DIVISION**EAST LOTHIAN****Admitted**

- 1944 Fortune, Thomas H., Stoneypath Tower, Haddington
 1943 Lambert, Charles, Jun., Whitekirk Newmains, North Berwick
 1943 Lambert, Charles David, Whitekirk Newmains, North Berwick
 1943 M'Nicol, John Hamilton, Castleton, North Berwick
 1943 Miller, Hugh Whiteford, West Fortune, Drem
 1943 Miller, James, Prora, Drem
 1943 Niven, Alexander, Lawhead, Prestonkirk
 1943 Watson, Rupert, Fenton Barns, Drem

MID-LOTHIAN

- 1944 DARLING, Sir William Y., 49 Northumberland Street
 1944 Foggie, Angus, B.Sc., M.R.C.V.S., Moredun Institute, Gilmerton
 1943 Greig, Alastair, B.Sc., M.R.C.V.S., 59 Kirkbrae, Liberton
 1943 Harbour, H. E., B.A., M.R.C.V.S., Edinburgh and East of Scotland College of Agriculture, 13 George Square
 1943 Kay, William (William Kay & Sons), 19 South St David Street
 1943 M'Ewen, A. D., D.Sc., M.R.C.V.S., Moredun Institute, Gilmerton
 1944 Martin, Hugh Leslie, c/o Thorburn, 46 Strathearn Road
 1943 Martin, James D., 25 Charterhall Road
 1944 Sellar, Thomas, Edinburgh and East of Scotland College of Agriculture, 13 George Square

5.—ABERDEEN DIVISION**ABERDEEN**

- 1944 Peter, William Charles, Thorneybank, Rothienorman
 1944 Smith, Frederick K., 54 Garden Place
 1944 Smith, Ronald G. C., 54 Garden Place
 1943 Stewart, A. B., B.Sc., Ph.D., Macaulay Institute for Soil Research, Craigiebuckie

ANGUS

(EASTERN DISTRICT)

- 1944 Baillie, J. Lindsay, Little Fithie, Farnell, by Brechin

BANFF

- 1944 Allan, Edward J., North Sandlaw, Banff

- 1944 Cameron, Robert, Beechbank, Fordyce, Portsoy
 1944 Currie, James D., Clune, Cullen
 1944 Davidson, James A., Culbuckly, Banff
 1944 Ferguson, Major J. L. S., Todhills, Banff
 1944 Johnson, Arthur H., O.B.E., 95 High Street, Aberdeen
 1944 Peter, William, Ordens, Banff
 1944 Young, George R., Arndoul Mains, Buckie
 1944 Youngson, John, Ladyshodge Farm, Banff

KINCARDINE

- 1944 BURNETT, Major-General Sir James L. G., Bart., C.B., C.M.G., of Leys, Crathes Castle, Crathes

6.—DUMFRIES DIVISION**DUMFRIES**

- 1943 Little, William, Cleughfoot, Beattock
 1944 Millar, Lieut.-Colonel John Smith, c/o John S. Millar & Son, 91 High Street, Annan

- 1943 Stewart, James, Hall Dykes, Lockerbie

7.—INVERNESS DIVISION**INVERNESS**

- 1944 Barclay, Marshall Lindsay, Inland Revenue Valuation Office, 58 High Street, Inverness
 1943 Clark, J. Alasdair, Loch Leven Hotel, Onich

MORAY

- 1944 Ritson, F. A., 117 High Street, Elgin

ROSS AND CROMARTY

- 1944 Ropner, Mrs M. Forbes, Aldie, Tain

8.—BORDER DIVISION

EMBRACING THE

COUNTIES OF BERWICK (INCLUDING THE TOWN OF BERWICK-UPON-TWEED), PEEBLES, ROXBURGH, AND SELKIRK.

BERWICK

Admitted

1943 Young, George, Fegorrig, Duus

ROXBURGH

1944 Anderson, William Angus, Millheugh,
Jedburgh

1944 Anderson, William Smith, Millheugh,
Jedburgh

PEEBLES

1944 Bogusz, Edward, 99 Northgate, Peebles

1943 Brown, John, Bennington, Peebles

ENGLAND AND WALES

1913 Dawson, J. R., British Ropes Ltd.,
Sunderland

1943 Dennis, Frank Whitworth, of Frampton
Hall, by Boston, Lincs.

1944 Reid, John, M.R.C.V.S., D.V.S.M.,
10 Osterley Road, Isleworth, Middle-
sex

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FOUNDED 1784

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3. To report Ploughing Matches for Medals that may be offered.
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5. To reduced rates for exhibits in the Society's Shows.*
6. To have Manures and Feeding-Stuffs analysed at reduced fees.
7. To have Insect Pests and Diseases affecting Farm Crops inquired into.
8. To Attend and Vote at General Meetings of the Society.
9. To Vote for the Election of Directors, &c., &c.

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This scale of fees applies only to Members whose subscriptions are not in arrears.

The Fees of the Society's Chemist for Analysis made for Members of the Society shall, until further notice, be as follows:—

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Chemist.—Mr J. F. TOCHER, D.Sc., LL.D., F.I.C., Crown Mansions, 41½ Union Street, Aberdeen.

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Zoologist.—Mr A. E. CAMERON, M.A., D.Sc., University of Edinburgh, 10 George Square, Edinburgh.

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The Society devotes the whole of its resources to promoting the interests of the Agriculture of Scotland and allied industries.

The scope of the Society's work, beyond its great Annual Show, is indicated so far in the foregoing brief statement of the privileges of Members. Much is done, however, in addition to all this.

The Society makes grants of money and medals to a large number of Local Farming, Horticultural, and other Societies.

In conjunction with the Royal Agricultural Society of England, it holds annual examinations, and grants Diplomas in Agriculture. In conjunction with that Society and the British Dairy Farmers Association, it holds annual examinations, and grants Diplomas in Dairying.

The Society avoids questions of political controversy, but in other public matters of practical concern to Agriculture it seeks to guard and promote, by every means in its power, the welfare of all interested in the Agriculture of Scotland.

The influence and usefulness of the Society depend mainly upon its strength in membership. The Members, through the Directors whom they elect, have the

* Firms are not admitted as Members; but if one partner of a firm becomes a Member the firm is allowed to exhibit at Members' rates.

practical control of the affairs of the Society. The stronger the body of Members, the greater will be the usefulness of the Society. It will therefore be to both their own and the public advantage if all who are interested in Agriculture, and who are not already enrolled, should at once become Members of the Society.

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Candidates for admission to the Society must be proposed by a Member, and are elected at the half-yearly General Meetings in January and June. It is not necessary that the proposer should attend the Meeting.

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* It must be stated, on behalf of Candidates claiming to be admitted at the Lower Rate, 10s., under which of the above designations they are entitled to be admitted at that rate.

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NAMES AND ADDRESSES OF CANDIDATES.		State whether on £1, 3s. 6d. or 10s. list
Name		
*Occupation		
Address		
County		
Name		
*Occupation		
Address		
County		

* Must be filled in where Candidate claims to be eligible under the lower or 10s. rate of Subscription

Signature of Proposer

Address

Date

1944

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